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PIMLICO

IN September of 1936 we recorded in our columns that the block of about 1,200 flats known as Dolphin Square, London, on the north bank of the Thames, had its central heating and hot water supply provided by coke (automatically fed boilers consuming something like 3,000 tons a year), with either gas or electricity for 'topping-up.' In September last we referred to the scheme now under way for the utilisation of 'waste heat' from the Battersea power station for domestic space heating and the provision of hot water. It is an important experimental district heating scheme, the first in this country of the thermo-electric type, and the necessary plant and equipment is being erected. The Westminster City Council is now in course of building the Pimlico housing estate. This estate will ultimately comprise 1,632 flats together with community centre, day nurseries, shops, and other buildings; heat from the power station will be fed to the estate, and we understand that an extension to serve the 1,200 flats in Dolphin Square is under consideration. Hot water from the power station across the Thames will be conveyed by under-river tunnel, a heat accumulator on the Pimlico estate being part of the general scheme—a scheme which is, of course, of great interest to the gas industry as a whole, not only to the North Thames Gas Board within whose area the venture is being made.

The idea of the district heating scheme, thermo-electric or operated by coal-fired independent boiler plant, seems to hold fascination for politician and public alike, and it is really astonishing to consider the vast amount of talk which has taken and is taking place on the subject and the mass of papers published about it. Are we wrong in suggesting that the 1936 coke-fired Dolphin Square scheme was in the nature of a district heating scheme? It got no publicity as such—perhaps because it has proved economical in practice; perhaps because coke was used instead of coal. Be that as it may, if heat from the Battersea power station is supplied to Dolphin Square, which is more than likely, the district heating load of the Pimlico scheme will be increased by 60%. It may be mentioned that in the passage through the House of Commons in 1947 of the London County Council General Powers Bill, permission was obtained to insert clauses conferring on the L.C.C. and the Metropolitan boroughs powers to supply district heating and hot water by means of hot water and steam. When the Bill reached the House of Lords, petitions were presented on behalf of the Conjoint Conference of Public Utility Associations, the Gas Light and Coke Company, and the Metropolitan Water Board, as a result of which the promoters agreed to limit the powers originally sought by restricting the area to that of the Westminster City Council and by restricting the scheme to the use of hot water as heat carrier. Subsequently other amendments were conceded, among them being the following:—That the scheme for district heating should be restricted to the supply of heat from the Battersea power station; that the heating undertaking should be treated as a separate entity with its own finances; that the charges should be shown separately; that reports should be made to the Ministry of Health and that electricity, gas, and water undertakings should be entitled to receive copies of such reports. It was further laid down that the Westminster City Council should provide the necessary apparatus (water meters, heat recorders, and the like) to render possible the compilation of reliable information regarding the success or otherwise of the experiment. The importance of these various amendments will be obvious.

ECONOMICS

WE have mentioned the apparent fascination which district heating schemes hold for politicians and public alike. Perhaps American projects have influenced the issue without proper thought being given to American conditions and general housing practice. It cannot be too strongly emphasised that a fundamental difference between U.S. and British practice in regard to district heating is that the Americans are prepared to subsidise their State-aided schemes, whereas we consider, quite rightly, that schemes of district heating should be run on an economic basis. In Great Britain housing subsidies are based on a ratio of 2:1 as between State and rate aid, the basis of our subsidy being found by taking at intervals the cost of building, the cost of money to be borrowed, the ability to pay, and, maintenance and manage-

ment charges. The local authority fixes the rents; the responsibility for provision of houses is laid upon the local authority, though the State can step in and provide houses at the expense of the local authority if the latter fails in its duty. In the U.S.A., there are no similar mandatory powers. When the local authority desires Federal financial aid it sets up local housing agencies responsible either to itself or to the State for carrying out the work. The conditions of grant are that the houses should provide shelter, heat, light, power, and hot water, that they should be let at rents equal to one-fifth or one-sixth of family earnings, and that the Federal Government should pay five-sixths of the annual deficit. These elastic conditions mean that district heating schemes are seldom analysed on a cost basis as separate entities. There is little evidence in America of how much hot water, for example, would be used if the tenants paid for it themselves and practically no evidence at all of the minimum service necessary, of the amount of restriction that could be imposed with reasonable satisfaction, or of the problems that might arise with families of different size and in different income groups.

To return to the specific case of Pimlico *cum* Dolphin Square, we would record that the consulting engineer for the scheme made his report in 1946. Since then costs of labour and materials have increased greatly, in some cases by as much as 100%, and the rate at which money can be borrowed has, of course, increased. Indeed, in the interim the Westminster City Council did in fact consider abandoning the scheme, but, due to contracts with the British Electricity Authority, this proved impracticable. The original estimate for the Pimlico scheme was £53,100. Revision produced an estimate of £184,000—an increase of £130,900. As a consequence the estimated cost of heat supplied had to be increased for the first part of the scheme from 10.38d. per therm to 16.88d., and from 5.48d. to 8.52d. for the scheme as a whole. We understand that the terms on which heat is to be supplied to Dolphin Square are to consist of a standing charge of £9,000 a year and metered heat at 4d. a therm, giving an overall estimate of about 7.5d. per therm. But costs are rising; and it is significant that the existing boiler plant at Dolphin Square is to be retained as standby in case of breakdown of the district heating scheme.

Apart from this cost per therm for district heating—and this is, of course, a most important consideration—we would emphasise, not for the first time, that district heating as understood and estimated provides a limited service only. It provides no facilities for cooking and provides no due facilities for extra heat required during the cold spells which are a commonplace of the British winter. District heating economics are based on providing a base heating load, leaving the cold spells to be dealt with by other means—whether solid fuel, gas, or electricity. Given comparable density of heat demand per acre, we maintain our view that the gas industry can provide a service much more comprehensive than that offered by the much vaunted but unproved district heating schemes, and that it can provide this comprehensive service at a lower cost and in a very much more flexible way. Only if it can be proved that gas or gas and coke are more expensive than district heating should the more limited service possible with district heating rank for heavy capital outlay. If district heating should prove to be better both technically and economically than the service which the gas industry can offer, it would be ineffective for the gas industry to place any hindrance in the way of its development. But no such case for district heating has been proved.

CHELSEA'S LIGHTING

THE intricacies of pre-war lighting contracts between gas undertakings and local authorities are well known, and it is equally recognised that the element of cut-throat competition between gas and electricity which attended such arrangements, while it brought little credit to the gas or electricity undertakings concerned, often proved of some benefit to the ratepayer, reflected in reduced prices for the lighting load and in maintenance costs.

We were sharply reminded of this fact when we attended a meeting of the Chelsea Council last week at which the metropolitan borough's lighting contract came up for discussion and criticism. The Council's original agreement was made with the Gas Light and Coke Company in 1936 for the maintenance of street lighting over a period of 15 years. When public lighting was suspended at the outbreak of war it was mutually agreed that the duration of the contract should be extended for a period corresponding to that of the war. Thus, when public lighting was resumed in November, 1945, the contract was renewed and is due to expire in 1957. At the same time the Gas Light and Coke Company agreed to pay 50% of the additional maintenance costs above the 1939 level. In comparison with several other boroughs Chelsea did, in fact, come under the 'favoured nation clause.' Not content with that, the borough insisted on priority of treatment in bringing their lighting up to the permitted standard, and directed that the question of any additional payments in future years should be reviewed annually after an inspection of the Company's books and accounts by the Council's officers. In effect, the Gas Light and Coke Company under the terms of the existing agreement arranged to subsidise the ratepayers of Chelsea to this extent.

It would now appear from information provided at the Council meeting that the cost of labour and materials incurred by the former Gas Light and Coke Company in maintaining the bright lights of Chelsea have mounted considerably since 1945. The additional cost to date, as yet shared equally by the Company and the Council, is £2,900 per annum. The Council has now decided, on receipt of a request from the North Thames Gas Board for a sum of £450, half of the increased cost incurred by their predecessors for the year 1940-50, to pay their share this time; they have at the same time, however, informed the board 'that the Council is not prepared to accede to any request for further increases in future years, even if there be any proved increases in the board's maintenance costs, and that the Council reserves the right to reduce the existing increases in future years if it so decides on the next annual review.'

It was suggested by the minority party in the Council that this point of view would never have been adopted if the gas company had remained un-nationalised in the hands of private enterprise. Politics, said Councillor

Captain C. Townsend, Chairman of the Highways Committee, did not enter into the matter—the question of calling a halt to the rising costs would have arisen whoever was in control of the gas supplies. The Council's opinions were further amplified by Alderman A. G. Thesinger, who pointed out that in contrast to the original contract of 1945 the nationalised board is not permitted to afford priority to any consumer or body of consumers, and he reminded members that if the Council continued to accept indefinitely such increases, there was little or no incentive for the board to reduce its maintenance costs.

Thus, it appears quite clear that the Council, far from being grateful for the more than generous treatment already granted, has enjoyed its piece of rich cake, and is now asking that future slices should have a layer of pale pink icing. Doubtless the note of priority will not be sounded in future contracts.

SULPHUR IN SPENT OXIDE

IN the current standard sulphur test of spent oxide the sample is extracted with carbon bisulphide in a Soxhlet's apparatus. The CS_2 is then distilled off, but the residue contains not only the sulphur but some at least of the 'tarry matter.' The residue needs to be treated with sulphuric acid and again extracted with CS_2. M. Louis Fassina, a technical engineer in the Manganese Laboratory of the C.N.R.S., has suggested a 'selective solvent,' sulphuric ether, which, used in exactly the same apparatus, will dissolve the sulphur but neither the coal tars nor the resins which may exist in the wood sawdust used to lighten the oxide. He has observed experimentally that, thanks to its selective solution of sulphur, which, however, takes place only at the rate of 0.188 g of S per 100 g of ether (or 0.26 g per 100 cc), the extraction of S by sulphuric ether is effected as rapidly in the Soxhlet apparatus as by carbon bisulphide. But this sulphur is pure S and is directly measurable after drying out from the solvent.

M. Fassina also proposes the use of animal black as another method to obviate the difficulties inherent in the presence of tars in the spent purifying material. The proposed method is based upon the property of animal charcoal to retain the tars and thus to permit the selective solution of the sulphur in carbon bisulphide. About 1g of animal black is placed in the bottom of the extraction thimble, into which is then inserted about 2 to 3 g of the spent oxide mixed with 2 or 3 times its weight of animal black. The weight of pure sulphur in the sample is deduced from the weight of the residue in the thimble after extraction. By combining the present standard method (without animal black) with either of the proposed new methods, the quantity of 'tarry matter' in the sample can be easily deduced. The advantage of either of the new methods, in shortening the time required in the laboratory for the determination of sulphur, is obvious.

Last year M. Fassina published in *Chimie et Industrie* an account of his work on the problem of dry purification in the French gas industry arising out of the fact that there is no indigenous supply in France of purifying materials, natural or artificial—all must be imported from Germany, Belgium, or Holland. He is manufacturing a mixture of manganese and ferric hydrates granulated with sawdust or peat and brought to a definite humidity. He claims that the Fassina material can be retained in the purifier box several times as long as such a material as 'Lux' and that after four months' working it was still friable. In any case 'Lux,' he states, is becoming unobtainable, partly by the cessation in Germany of the manufacture of aluminium from which it is derived. M. Fassina claims that the higher price of the mixture of manganese hydrates with ferric hydrates will be more than balanced by the advantages of a greater purifying efficiency, quicker revivification, saving in labour owing to the absence of hardening and the granular texture of the spent material which increases its value in the sulphur market.

All this is reminiscent of Mr. G. V. Hopton's proposed 'nodules' which he described in April, 1948, and which we trust are not being lost sight of by the Purification Panel of the Research Board. A translation of the author's account of his work will be found on p. 233.

HOPE FOR HOSPITALS

OF the many and varied facets of gas service which form the subject of papers and discussion within the industry, few are more neglected or more worthy of development and publicity than the part played by gas in hospitals. It is therefore of interest to note the careful treatment of this subject by Mr. F. J. Kerridge, of the Public Services Section of the North Thames Gas Board. Originally presented to sales groups within the board's area, this paper is being published for the first time in *Gas Service*, the first of the two instalments appearing in the October issue.

The fundamental unit in a hospital, states the author, is the individual sick person, and any study of hospital planning must start from the needs of that individual. The varied needs of many individuals result in the complexity which is a feature of major hospitals today, and this complexity is of necessity reflected in the diverse requirements of gas and similar services. Mr. Kerridge 'breaks down' this complicated subject into separate but interdependent compartments, and exercises both care and caution in examining their every problem. He commences by describing the lay-out of a typical ward unit and its principal ancillary units, explaining its exact purpose and the type of gas service required. Those who may be unfamiliar with this highly specialised subject cannot but be interested by this general guide to the modern hospital; those whose work lies in or near this sphere may, we suspect, be a little envious of Mr. Kerridge and the very complete and well-equipped hospitals with which he deals. The smaller 'cottage' hospitals are not so rich in research facilities and accommodation for education as the type of hospital described in this paper.

The paper divides itself logically into two parts: The first, already mentioned, being concerned with the requirements of each and every section of a hospital; and the second with a detailed examination of the various appliances involved, their peculiar characteristics, and the stringent qualities they must display. In this regard the

author's observations serve as a valuable introduction to such operations as sterilisation of instruments, dressings, &c., refrigeration as applied to the care of drugs, bacteriological specimens, serums, colour films, &c., and incineration on the scale and of the accuracy required in a hospital.

Throughout the greater part of his discourse, the author is informative without being provocative, and presents his facts with mild—though none the less valuable—comment. On the topic of standardisation, however, he is more outspoken. The subject is one which is receiving increased comment from various bodies in the gas industry, and it would appear that the need for standardisation of equipment for medical purposes is a matter of particular urgency. At the present time when architects are giving considerable thought to modernising existing hospital buildings and planning future hospitals, often with the influence of Continental design, the gas industry will be expected to play its part. 'The success of our efforts,' remarks Mr. Kerridge, 'will be judged by our ability to assist in the production of the right type of equipment.' He points out that three parties are concerned in the successful design and manufacture of an appliance—the appliance maker, the gas undertaking, and the consumer—but that the existence of the first two is ultimately dependent on the last-named. 'I am not sure,' he continues, 'that the needs of the hospital have been satisfactorily interpreted to the designers of gas appliances. I am referring particularly to the apparatus used in the laboratory and for sterilising purposes.' This, he suggests, has not unnaturally, led to the production of apparatus having low thermal efficiency, and further research is desirable to improve design, particularly burner equipment, to incorporate satisfactory controls and to improve combustion standards. In this connection it is of interest to note the formation of a Hospital Equipment Standards Advisory Committee, set up by the British Standards Institution, with the following terms of reference: To investigate the need and to make recommendations for the preparation of British Standards for articles of hospital equipment in common usage, especially those requiring continual replacement, and for such further equipment as may from time to time be considered desirable; and to make recommendations for any necessary action to develop the use of British Standards prepared on the recommendations of the Advisory Committee.

The National Health Scheme, maligned as it may be in some quarters, is undertaking certain work long overdue in this country. In this respect the examination of facilities available in existing hospitals is of particular importance. We shall not be committing ourselves too far in predicting that conditions of efficiency in certain of the older hospitals, particularly the efficiency of appliances, is lamentably low. It would be interesting to know what percentage of sterilising equipment in British hospitals fulfils the purpose for which it was designed. And although some sympathy is due to hospital authorities hitherto unable to meet the cost of replacing inefficient equipment, we wonder how much attention is paid to hospital apparatus by gas undertakings, and whether they have adequately recognised the moral obligation to maintain this equipment in a condition which assures the highest pitch of efficiency.

CONSULTATIVE COUNCILS AND THE PRESS

THE Gas Consultative Councils are getting into their stride, and from the reports we have received of the meetings held to date they are obviously destined to play a useful rôle as a liaison between the area boards and the general body of gas consumers. So far as we have been able to ascertain only one of the 12 councils has been unable from the outset to agree to admit the Press to its deliberations and in that case —we quote from a letter from the Chairman—'the question of the admittance of the Press to our meetings was discussed at our second meeting, and although favourably received the time was not considered opportune until all preliminaries had been settled; a decision was therefore deferred until the next meeting.' It was with some surprise that we received a report last week that a Todmorden alderman had sought to persuade the North Eastern Gas Consultative Council to exclude the Press from its meetings on the ground that the presence of reporters 'cramped discussion.' Standing orders having already been approved providing for the admission of the Press, the Chairman ruled the alderman's proposal out of order and asked for a notice of motion on the matter. As in the case of local authorities, it is always open to the consultative councils to exclude the Press during any portion or the whole of a meeting, and it is conceivable that there will be many occasions when this course is desirable and proper. Under the new régime the gas industry is more than ever a matter of public concern and it would be unfortunate if the consultative councils decided to meet behind closed doors. Even when matters of a confidential nature are discussed we hope that a brief official statement will be issued as soon as such matters have reached finality. The councils have definite duties laid upon them under Section 9 of the Gas Act, and the public will be interested in seeing that they are satisfactorily discharged.

COKE OVENS AND GAS SUPPLY

As Mr. A. H. Winspear remarked in his address as President of the Coke Oven Managers' Association on Thursday last (the address is published in to-day's *Journal*, p. 234), the manufacture of base load gas in coke ovens is increasing in gasworks practice. Beckton (North Thames) is, of course, the outstanding example. It will be recalled that last November the Duchess of Kent inaugurated a third battery of coke ovens at the Beckton works—the third step of a flight of stairs which when completed will mean a coke oven plant at a gasworks which will give a daily output of 37 mill. cu.ft. of gas. The South Eastern Gas Board (South Metropolitan unit) is erecting coke ovens. Coke ovens supplying the West Yorkshire grid are in operation at Hemsworth. This plant is highly praised. The gas industry is now buying from coke ovens about 55,000 mill. cu.ft. of gas a year. Mr. Winspear spoke of the potentialities presented, through nationalisation, of greater inter-working of the coke oven industry and the gas industry, expressing the hope that in the not very distant future 'surplus' gas will no longer be a designation of coke oven gas. We look forward to closer working between the two industries, the while re-iterating our view that the best working policy would be for the gas industry and the coke oven industry supplying gas to the public to be placed under unified control. All carbonising and ancillary processes within this field—and it is a wide and ever-growing field—should be concentrated in one authority. Coke ovens coming within a colliery section of the National Coal Board should in the best interests of the community come within the ownership of the nationalised gas industry. Those coke oven plants now controlled by the N.C.B. should be transferred to the ownership of the area gas boards. More and more are coke ovens other than those situated at iron and steel works becoming essentially a part of the gas industry as far as their functions are concerned. The most efficient utilisation of coal can be

ensured only by placing all carbonising processes concerned with the supply of gas to the public under one authority. How would the Coke Oven Managers' Association fare under such a scheme? There is always the Institution of Gas Engineers.

AMERICAN GAS SALES

A REPORT of utility gas sales in America, published by the Bureau of Statistics of the American Gas Association, gives a total revenue for the gas utility industry of 391 mill. dollars in the second quarter of this year. This represents an increase of 9.2% over the 358 mill. recorded over the same period in 1948. Revenues from domestic sales rose by 7.7%, compared with the second quarter of 1948, to 235 mill. dollars; commercial sales recorded the largest percentage gain, rising by 18.5% to 53 mill. dollars, and industrial sales increased from 95 mill. dollars to 103 mill. dollars in the period under review. On June 30 the gas utility industry was serving 22.9 mill. customers, equivalent to an increase of 4.6% over the corresponding figures for 1948. Domestic consumers rose by 3.8% from 20.4 mill. to 21.1 mill. in the period under review; commercial and industrial consumers showed an increase of 16.2% and 6.8% respectively. A section devoted to manufactured gas shows that sales to ultimate consumers were 2.2% lower in the second quarter, declining from 107 mill. cu.ft. in the same period last year to 104 mill. cu.ft. in the current quarter. Revenues from these sales were, however, 6.1% higher than in the corresponding period last year. At the end of the second quarter 8.6 mill. consumers were being served, an increase of 0.4%. Revenues from industrial sales fell by 0.1% to a total of 12 mill. dollars. Revenues from all other classes of sales increased with the largest percentage gain being recorded by commercial revenues at 8%. Domestic and industrial sales declined by 2.1% and 5.4% respectively, as compared with the same quarter of 1948, while commercial sales increased by 0.6%.

S.A.G.E.M. (EASTERN DISTRICT)

WITH a full programme of six monthly meetings to be held before the summer of 1950 the Eastern District of the Southern Association of Gas Engineers and Managers opened a new session last week in an atmosphere of enthusiasm no less keen than that which prevailed before nationalisation. Mr. W. K. Tate, Eastern Divisional Manager, Southern Gas Board, handed over the reins of office as Chairman to Lieut.-Colonel J. A. Gould, Distribution Engineer, South Eastern Gas Board, and was thanked for his major contribution to the success of the 1948-49 session. A District Chairman is judged largely by the quality of the papers presented during his year of office and partly by the attractiveness of what for some obscure reason is called the 'county meeting.' By both these standards Mr. Tate scored full marks, and the members look forward with confidence to his accession to the Presidency of the main Association, of which he is now Junior Vice-President. Colonel Gould opened his session with high promise in the list of authors and subjects for presentation. It had been hoped to report progress in the negotiations regarding the future relationship between the District Associations and the Institution of Gas Engineers, but although the Southern (embracing the Eastern and Western Districts) has made its position quite clear, there had been delay on the part of some of the other Associations in submitting their comments on the Institution memorandum, and a meeting of representatives originally planned for September had been deferred until Nov. 1. The technical fare comprised yet another paper on distribution, this time a joint contribution by experts from the Bryan Donkin Company on 'Gas Distribution: Modern Methods of Control,' a first instalment of which we publish in this issue. Dealing in detail with old and new devices for automatic control, both direct and remote, their paper showed how alive manufacturers are to the problems that confront the industry, especially in these days of integration.

Letters to the Editor

Domestic Heating Requirements

DEAR SIR,—In the editorial comment on page 34 of your issue of Oct. 5 you refer to an apparent divergence between figures quoted for heat requirements in Dr. Weston's paper 'Heating Research in Houses' and in I.G.E. Communication 278.

Weston's figure of 680 useful therms for heating and hot water refers to a dwelling with whole house heating and a mean temperature of nearly 60°F. which represents the type of conditions stipulated in many of the proposed district heating schemes.

The temperature standard adopted in I.G.E. Communication 278 was lower and based on Egerton recommendations. I have commented elsewhere on the waste of fuel involved in keeping rooms unoccupied for most of the day at near comfort level. The space heating requirement is enormously affected by a few degrees rise in mean house temperature. For instance, an increase of 7½°F. may double the useful therms required.

Further, the air change in the houses at Abbots Langley, which incidentally were somewhat larger in floor area and volume than those given in I.G.E. Communication 278, was about double that suggested by Egerton, and the additional heat loss represented at least 100 useful therms.

There is no all-gas house at Abbots Langley, and it is most misleading to try, as you have tried, to make comparisons with the all-gas house in I.G.E. Communication 278.

It is more appropriate to find which fuel systems in the houses at Abbots Langley are similar to examples quoted in I.G.E. Communication 278. There is one house which is reasonably comparable—*viz.*, No. 21, which has an open coke fire with back boiler and gas instantaneous multipoint for summer water heating, and can be roughly compared with data from I.G.E. Communication 278 for a house having the full Egerton standard of hot water and with a convector coke fire, back boiler, auxiliary gas space heating, and an instantaneous multipoint water heater for summer use.

House 21 had a mean temperature of 56.3°F. and the annual gross thermal input for space heating and hot water was 810 therms. A temperature approximating more nearly to the Egerton standard would have been obtained in an uninsulated house. The inputs estimated in I.G.E. 278 for a house with the above services was 785 therms. Thus, there does not appear to be any wild discrepancy between our estimate and the Abbots Langley result. While we must, of course, wait for further information on the tenanted phase, what is important from the gas industry's point of view is that the two houses at Abbots Langley with coke appliances, back boilers, and gas summer water heating, were the two lowest in fuel consumptions and coal requirements. New gas and coke appliances are being installed in some of the houses which should provide further information of special interest to the gas industry.

May I, Sir, in conclusion take this opportunity of assuring you and the readers of your somewhat unfortunately worded article that there is the closest and friendliest co-operation between those working at Abbots Langley and those, as you put it, engaged at Watson House.

Yours faithfully,
G. C. HOLLIDAY.

North Thames Gas Board,
Watson House, Townmead Road,
Fulham, S.W.6.

October 22, 1949.

The Fitter's Lot

DEAR SIR,—I have read with considerable interest comments in the *Gas Journal* regarding the shortage of trained personnel on the supply side of the gas industry. I think the explanation is not hard to find. I suggest, in fact, that there is not the shortage that certain responsible people within the industry would have us to believe.

Too much emphasis is placed on the importance of qualifications. Unfortunately these are not always a criterion of a person's ability and knowledge of a subject, and certain qualifications have become of little consequence. Again, the word 'experience' needs elaborating. From my knowledge of the

industry, there are those whose experiences regarding the technical side of their work would make dull reading. My query is how a person who does not possess the experience necessary for advertised posts can obtain such experience. The tendency is for a person who excels at his particular work or craft to 'stay put.'

The magnitude of a fitter's work and responsibility is seldom realised. I read, recently, an advertisement for a first class fitter, the rate of pay offered being 2s. 7½d. per hour. I appreciate the fact that this post was not in an industrial area; nevertheless, the would-be applicant had to be conversant with *all* classes of gasfitting work. Why should there be discrepancy in rates of pay from area to area? Surely a first class fitter is the same wherever he is? Does the standard of first class fitting vary from town to town? Some weeks ago I read an interesting article in the *Gas Journal* relating to the Gasfitters' Classification Scheme. One point was not mentioned, however—that in view of the difference between rates of pay (within a given area) the scheme may just as well be abolished. Theoretically, there is a difference; practically, it amounts to almost nothing. The basic weekly wage (44 hours) of a first class fitter is equivalent to a second class fitter's wage for 46 hours—a small addition of overtime, which can be easily obtained.

A fitter's task is not easy. It is he who forms a valuable link between consumer and undertaking. With his help the goodwill of the industry has to a great extent been built up. According to the practical application of his technical knowledge, the efficiency of gas as a fuel is largely judged. Until those who constitute the backbone of the gas industry are given better prospects and allowed to take a more active part in the administrative affairs of the supply side, many of the difficulties confronting this branch of the gas industry will remain.

Yours faithfully,
R. E. SHANTON.

1, Munster Road, Portsmouth.
October 13, 1949.

No. 9 Conduit Street

DEAR SIR,—Inspired by the account in your issue of Oct. 12 of the opening by Sir Edgar Sylvester of the new Gas Council display at the Building Centre, I visited No. 9, Conduit Street, filled with expectation though prepared for disappointment. May I say at once that your enthusiastic comments on this permanent exhibit were in no way misplaced and that I was genuinely impressed by what I saw there. My intention was a short visit; in fact I stayed there a long time with undiminished interest.

What a hive of industry No. 9 is! And I wonder whether those within the gas industry—and not just those in the Greater London area—realise the worth of this very live gas display, which breathes modernity. It did not take me many minutes to appreciate that the small, though admirably set out, exhibit of the Gas Council exemplifies both co-operation and the art of display. The gas section is surely an information bureau alike for architect and builder, the general public, and parties of students of many crafts whose continuous visits are a valuable feature of the Centre's work. I should not like to hazard the amount of concrete business which accrues directly and indirectly to the gas industry through No. 9, Conduit Street.

At the risk of trespassing on your space, I would add two further comments. In such a straightforward display, where the performance of the appliances shown speaks for itself, it struck me as odd that such detailed description should be lavished on the simple 'balanced flue' principle. The diagrams, with their many arrows, are, I suggest, likely to defeat the object of the exhibit and to give the impression of complexity rather than simplicity. My other comment concerns an omission. Was it intended that there should be no exhibit of bottled gas apparatus? Perhaps this is a question of lack of co-operation on the part of the sellers of bottled gas; or is it that the gas industry does not consider that bottled gas comes within its field? Maybe the explanation lies in the uncertainty of supply of the bottled gas itself. I raise the point because I know that both architects and the general public are interested in the use of this mobile form of gas.

Yours faithfully,
BELIEVER IN DISPLAY.

October 20, 1949.

Personal

Mr. **J. M. Backhurst** has been appointed Southern Manager of Ascot Gas Water Heaters, Ltd., responsible for the Southern and South Eastern Gas Boards, and Mr. **E. J. Perks** will now be responsible for the Wales Gas Board, West Midlands, and East Midlands Gas Boards with the title of Midlands Manager. Mr. Backhurst will operate from the branch office at 124, Old Christchurch Road, Bournemouth, and Mr. Perks will operate from the branch office at 93a, Corporation Street, Birmingham, 2. This completes the reorganisation of the firm's sales territories.

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Mr. **C. L. Evans,** F.R.I.C., M.INST.F., Senior Research Chemist at Birmingham, has been appointed Chief Chemist and Process Manager at the Nechells Works of Brotherton and Co., Ltd., and will take up his duties on November 1 after 24 years' service with the undertaking. Mr. Evans first served for six years as shift chemist, retort house chemist and Assistant Works Chemist, and was seconded in 1931 for a period of 18 months to Dr. C. M. Walter's staff of the Industrial Research Laboratories for work on the formation of industrial gas centres outside the Birmingham area. Returning to the special laboratory, Nechells, in 1931, as Analytical Chemist, he worked on the testing of contract materials and analytical problems arising from the works. During the war years he was chiefly engaged in special work in the Chemical Facilities Scheme of the No. 9 Region Gas Engineering Advisory Board and in the operation of benzole recovery. Mr. Evans is Technical Secretary of the West Midlands Gas Board Liquor Effluents Advisory Panel and is the immediate Past President of the Midland Junior Gas Association.

Obituary

Mr. **E. W. Nicol,** late Senior Sales Representative of Wm. Sugg & Co., Ltd., died on Oct. 7. He entered the service of the firm 61 years ago.

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Mr. **Percy Wilfred Dent,** a Director and Secretary of Dent, Sons & Co., Ltd., tar distillers and manufacturing chemists, Harrogate, since the formation of the Company, died on Oct. 9.

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Mr. **W. B. Haycraft,** late Midlands representative of the Davis Gas Stove Co., Ltd. (Radiation, Ltd.), died on Oct. 17, at the age of 72. Well known in the Midlands, he joined the Davis Company in 1918, and retired in 1945. He was a rugby enthusiast, being representative of the Rugby Football Union for Nottinghamshire, Lincolnshire and Derbyshire, and was a director of the Newhaven Gas and Coke Company until nationalisation.

Diary

Oct. 28.—Northern Junior Gas Association: Meeting, Newcastle-upon-Tyne. 'Water Softening,' by a technical representative of 'Neckar' Water Softener Co., Ltd.

Oct. 28.—Manchester District Association of Gas Managers: Half-yearly General Meeting, Manchester. 'Utilisation of Refinery Gas,' R. Walker, Chief Engineer, and H. C. Applebee, Chief Chemist, Manchester Undertaking.

Oct. 29.—London and Southern Junior Gas Association: Visit to Rotherhithe works of the South Eastern Gas Board.

Nov. 1.—Wales and Monmouthshire Junior Gas Association: Visit to Works of Helliwells, Ltd. Paper, D. Muir. Treforest.

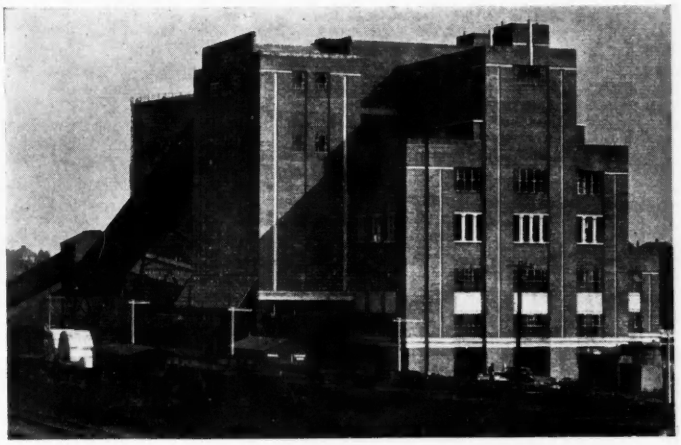
Nov. 2.—Eastern Junior Gas Association: Visit to Works of Ruston & Hornsby, Ltd., Lincoln.

Nov. 2.—Manchester District Junior Association of Gas Engineers: Visits to Stoves, Ltd., Rainhill, and British Insulated Callender's Cables, Ltd., Prescot.

Nov. 3.—Scottish Junior Gas Association (Western District): Evening Visit to Clydesdale Steel & Tube Works, Stewarts & Lloyds, Ltd.

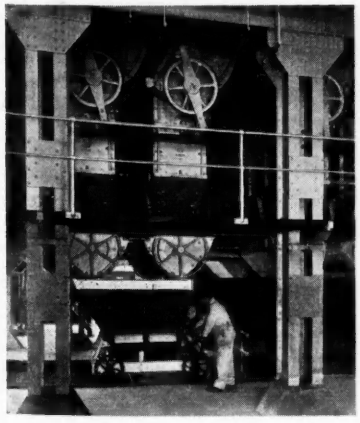
Pontypool's New Gasworks

ON Thursday last Mr. Alfred Robens, Parliamentary Secretary of the Ministry of Fuel and Power, in the absence of the Minister, Mr. Hugh Gaitskell, officially opened the new works of the Pontypool undertaking of the Wales Gas Board. On a 12-acre site an entirely new works has been built during the past two years, modern in every detail, in relation to the future developments of gas supply through the proposed Welsh gas grid. The capacity of the plant is 4 mill. cu.ft. a day and consists of continuous vertical retorts by the Woodall-Duckham Company. Provision has, however, been made for development up to 12 mill. cu.ft. a day without need for any shut-down. The plant and all the ancillary equipment was the subject of an exclusive illustrated article by the editorial staff of the *Gas Journal*, published in the issue of Oct. 27, 1948, which described fully the whole scheme, which constitutes one of the most interesting developments in current gas supply.



General view of the new plant from the railway embankment.

Mr. **T. Mervyn Jones,** Chairman of the Wales Gas Board, who presided, introduced Mr. Robens and commented on the industrial tradition of the area which. he said, had a long and honourable association with fuel and power and the great basic industries associated with them. More than five centuries ago, in 1425, iron was first smelted there and for upwards of two centuries tinplates had been made in the area. Now, four centuries had passed since there were incorporated by statute the first companies to develop mines and industries in Pontypool—one very appropriately called 'the Society of Miners Royal'—for surely a royal and vital calling was the winning of coal, still the essential raw material of this great new works as of Britain's industry. The date when these companies came into being was 1569, the reign of Queen Elizabeth; but even in those early days the coal industry had its problems. For in 1578 they read that an action was brought against Richard Hanbury, of the great family whose fortunes were linked with those of Pontypool, for 'Converting trees into coal and other fuel for the making of iron in the County of Monmouth to the great spoil, hurt and detriment of all the country thereabout.' The action was brought by the Crown. 'Good Queen Bess' had no Minister of Fuel and Power to advise her against letting loose the law officers of the Crown, and Pontypool had to pioneer against a government of that day which was neither fuel nor power minded.



Side view of the bottom ironwork, showing operation of the discharger.

It was fitting that the Parliamentary Secretary to the Minstry of Fuel and Power should come to Pontypool to inaugurate the new plant and mark the start of an action much more productive than that of 1578 which, to adopt the language of the old writ, they might properly describe as an action for 'converting coal into gas, other fuels, and most valuable by-products for the making of efficient homes and productive factories in the County of Monmouth to the great enrichment, comfort and benefit of all the country thereabouts and the furtherance of our country's interests in the markets of the world.'

While they welcomed Mr. Alfred Robens they were, naturally, disappointed that Mr. Gaitskell was prevented by reasons of State from being with them, but their regret at his absence in no way lessened their pleasure at the presence of Mr. Robens. For his colleagues and himself, as Chairman of the Wales Gas Board, the first public board to control a great industry throughout the whole of Wales and Monmouthshire, he wished to say how highly sensible they would always be of the personal part played by the Minister and Mr. Alfred Robens, as his Parliamentary Secretary, in constituting a Board whose responsibility was matched by its authority, and in establishing its membership with the exercise of much courage and equal courtesy.

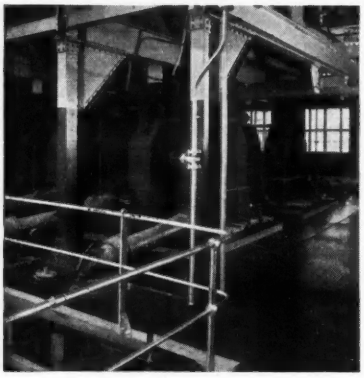
Mr. **Alfred Robens** expressed the regret of the Minister at his inability to come to Pontypool. It was the second time he had been disappointed for he had hoped to come to South Wales a short time ago when a member of the Royal Family had expressed a wish to go down a coal mine. It was remarkable the extent to which the need for gas had increased all over the country, and it said much to the credit of those who were responsible for public gas in the days of private ownership. They had laid plans from which the State in taking over as a national organisation had benefited greatly. He thought it would be quite wrong of him if he did not make that public acknowledgment.

Tracing the growth of the industry locally, Mr. Robens said that in 1938 the distribution of gas to the consumer was 239 mill. cu.ft. In 10 years they had seen a very great rise. It was not 239 mill. to-day but 831 mill. cu.ft. That was an enormous increase in a decade and it had only been accomplished by great ingenuity and the exercise of great engineering skill. The increase in the use of gas in Wales was a clear indication that they had well passed those bad old days of unemployment in the Welsh industrial valleys. He hoped that the Wales Gas Board would be able to keep pace with this increasing demand. The Board had a great part to play in the future of the industry in Wales.

There had been some great problems connected with the erection of the present plant. The suggestion that the Blaenavon coke ovens were to be given up had aroused great feeling, but he would not go into the matter now excepting to say that they had given it very careful consideration. They had eventually decided that there should be a new project at Pontypool—and there it was. But he felt it necessary to express his appreciation of the men who had been employed at the Blaenavon coke ovens for the fact that they had handled their job and maintained an increasing load of gas under intense physical difficulties. Behind their grievance was,

naturally, the great fear of unemployment with the closing down of the coke ovens, and in this connection they had taken great care to see that everything possible was done to minimise that fear. He was glad now to be able to tell them that of the 164 men employed on the Blaenavon coke ovens all but 30 were now gainfully employed and they were sparing no effort to see what could be done for the remaining 30. He was authorised by his Ministry and the Board of Trade to say that they would not fail in their duty to continue the efforts being made to establish more industries in Blaenavon.

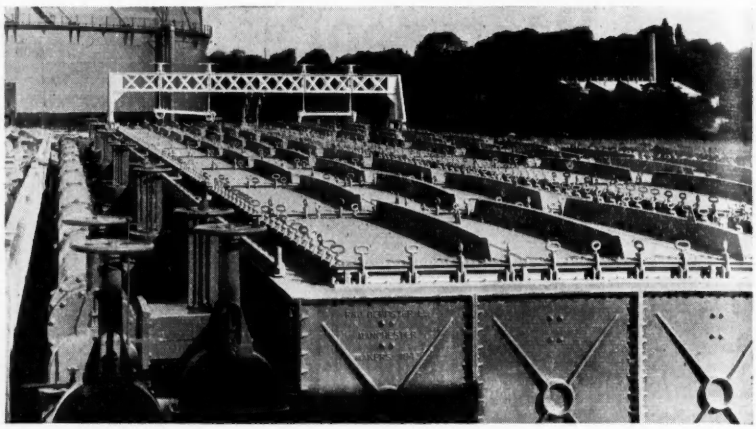
That great works which they were about to open was the very latest of its kind, incorporating all that was best in gas plant and to which the contractors had brought all their long experience in providing it with all the latest devices. He also paid a glowing tribute to the work of Mr. J. Powdrill, the Pontypool Engineer and Manager. When he first came to Blaenavon to see the coke oven plant there he had spent the day with



This photograph of the top of the setting gives a pleasing impression of the cleanliness of the new plant.

him and he had been greatly impressed by his enthusiasm and knowledge and the diligence with which he was pursuing his task in the erection of the new undertaking. In this job, in which he had been given a free hand, it was his (Mr. Robens's) impression that if he had been spending his own money in erecting the plant for himself he could not have exercised greater care and consideration. Behind it all lay a wonderful example of team work and ingenuity exercised both by management and workers. It had not been an accident. Behind it there had been a great amount of thought. As they all knew, there were to be established gas grids and this plant would be an important part of the new scheme covering this particular part of the area of the Wales Gas Board. Mr. Robens, in conclusion, said that it would now give him great pleasure to declare the new plant open.

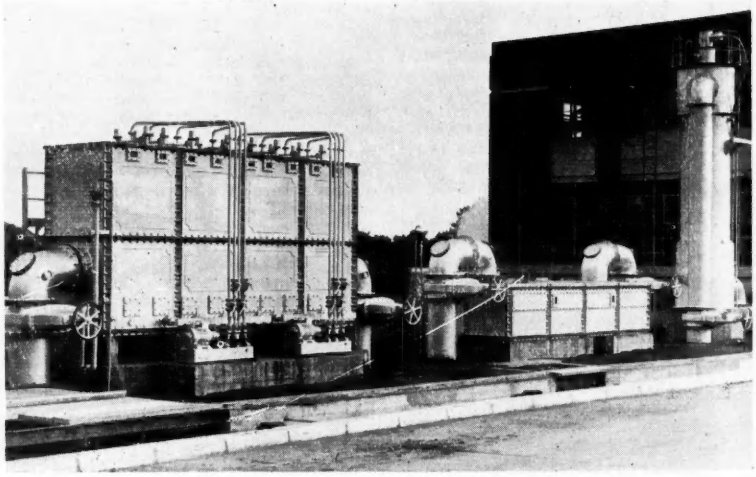
Mr. **T. T. Osborne,** an employee of the old company with 50 years' service, was introduced and given a rousing reception. Another old employee, Mr. **D. Constance,** with 41 years' service, proposed a vote of thanks to Mr. Robens and recalled the days when they used to take the cookers out to customers in a wheelbarrow. He paid a warm tribute to the staff which, he said, was second to none in the whole of Wales.



The purifiers (by R. & J. Dempster, Ltd.) have a capacity of 4 mill. cu.ft. per day and are of cast iron construction with steel covers. There are five boxes arranged in line and prepared for the addition of a sixth box later. Each box is 40 ft. by 35 ft. by 6 ft. deep, and has two tiers of grids. The boxes are operated by 24 in. diameter double seated disc valves fitted with rotating gear for cleaning the discs and seats in situ. *There are four steel covers to each box suitably stiffened with steel channels and angles. The travelling and lifting apparatus is fitted with ball bearings and designed to lift two covers simultaneously. A gas heater is provided on the main inlet to the purifiers.*

Mr. **J. Powdrill,** who was greeted with loud applause, seconded, pointing out that they had brought to fruition that afternoon the result of many years' planning. To-day their troubles, arising out of the limited number of therms available, were at an end. There were now battalions and armies of therms at the service of the public. In the erection of the plant they had tried to overcome any local objections to an unsightly structure in the landscape by wrapping around the undertaking an architectural structure which was, he thought they would all agree, pleasing to the eye. He extended his thanks to the members of the old Board of Directors for their confidence in him, demonstrated by giving him complete freedom in the planning of the works. Those thanks also went out to all the workers for the long, uncomplaining, hours of effort which had been demanded of them.

At the end of the ceremony, the company were conducted around the works in small parties and later entertained at tea.



The static washer, constructed by R. & J. Dempster, Ltd., and capable of dealing with 3 mill. cu.ft. of gas per day, is constructed of cast iron plates formed into nine compartments, having eight washing chambers and one drying chamber, each fitted with spirally wired bristle filling Sprays are fitted at the top of each washing chamber to provide a heavy rain of liquid, wetting the whole of the bristle filling and thus giving efficient washing. The liquid is delivered to the sprays by means of two Monobloc centrifugal circulators with electric motor drive, mounted on a common bedplate. The gas connections are 24 in. in diameter and the valves are of improved double-faced type.

Unification in the North East

THE North Eastern Gas Consultative Council held its third meeting at Leeds on Oct. 17, under the chairmanship of Mr. **W. Regan,** J.P. (Halifax). Dr. R. S. Edwards and Mr. G. E. Currier, Chairman and Deputy Chairman, respectively, of the North Eastern Gas Board, were welcomed by the Chairman.

The question of the appointment of local committees was discussed at length, the Chairman explaining that a local committee would consist of members of city, town, or rural councils, augmented by representatives of trade, commerce and labour (employees). Members of the branches of the Women's Gas Council might also be nominated. The committees would have to meet and consider in conjunction with the group managers and engineers matters affecting the consumers. Complaints and suggestions should be made known to local committees.

It was in the interests of the consumers for local committees to be in direct contact with the group manager and to meet within the area of their undertakings.

Mr. **G. H. Norton** (Keighley) said he was the only representative in his group between Bradford and Settle and industrial consumers had repeatedly asked him when the local committees were to be formed, so that they could state their grievances and make suggestions and requests.

Alderman **J. H. Whitaker** (Todmorden) sought to alter the standing order which permitted the Press to be present at meetings of the consultative council as in his opinion the presence of the Press cramped the discussions. He moved that the Press be not admitted.

The **Chairman** ruled this out of order and asked for a notice of motion on the matter.

In reply to Alderman **H. Hardy** (Morley), the **Chairman** said the consultative council had no power to discuss the price or quality of coal supplied to gas undertakings.

Mr. **Currier** said coal today was not being bought on the calorific value or ash content basis, but negotiations were still going on between the area board and the National Coal Board on the matter.

The meeting then discussed a summary of Press comment relative to the announcements of gas price increases by the area board. On this question, Alderman **Whitaker** said there was not a good word about the work of the consultative council or even of the area board as a whole. The majority commented only on the increased price of gas.

The **Chairman** said some Press comments had not been circulated and it was unfortunate, for they were very good, but he could not give the names of the papers concerned.

Measures Towards Uniformity

A statement from the area board was submitted with regard to decisions on measures towards unification of varying practices which became operative on Oct. 1.

With regard to cash sales of gas appliances, the price to the consumer is now the standard invoice price to the board, plus 25%. There was a wide variety of practice among the undertakings vested in the board, in that the percentages ranged from 37½% to 15%. By the introduction of standard sales terms, 89.55% of the domestic consumers either remain unaffected or enjoy decreases and 10.45% have to pay increases. In the case of bulk sales to local authorities or builders, the 25% margin has been reduced to 10%. Having arrived at the appliance price, *i.e.*, the invoice price to the board plus the 25% margin, the purchase tax, if any, is added.

Installation Costs

Enquiry into installation costs disclosed extensive variations between former gas undertakings. There were, for instance, 28 different rates for fixing cookers. The following are some examples of standardised terms now in operation: Cookers, £1 10s.; wash boilers and washing machines, £1 10s.; radiators, £1 10s.; gas fires, £2; coke grates, £2.

An analysis showed that 48 undertakings operated hire purchase schemes while 27 undertakings had no facilities available. The periods of hire purchase, where such schemes operated, varied from one year to 10 years and here the percentage accommodation charges ranged, according to the period, from 4% to 25%. The board has standardised hire purchase terms spread over periods of three and five years. For three years the accommodation charge is 10% and for five years it is 15%.

The effect of standardisation generally means that 71.67% of the domestic consumers either remain unaffected or enjoy decreases and 28.33% have to meet slightly increased accommodation charges.

Services

There was diversity of practice in charging for the laying of the service pipe from the gas main to the meter. Investigation showed, for instance, that eight undertakings gave the service free, six gave 60 ft. free, three gave 50 ft. free and 16 gave 30 ft. free. The variations were further complicated by the application of specific stipulations for a definite number of gas points in each house.

Now all mains and services situated in the public highway and supplying domestic consumers are laid free of charge. If houses are 'adequately carcassed' then the first 60 ft. of service laid in private property are also laid free of charge. Carcassing, for example, in new houses would be deemed to be adequate if points are installed for a cooker, wash boiler, and poker at the main fire place on the ground floor, and if piping is taken upstairs so that a supply of gas is readily available on that floor. The phrase 'adequately carcassed' must necessarily be regarded as flexible in view of the wide variations in circumstances that exist. Any excess of this length of 60 ft will be chargeable at net cost plus 25% for overheads.

When the general review of gas prices was placed before the Consultative Council at its last meeting, no specific mention was made of gas prices for street lighting. These were covered by the general statement that proportionate increases were being applied to all other than domestic consumers in so far as was permissible having regard to existing contracts.

Subsequent examination revealed a wide diversity in street lighting prices, ranging from 4d. to 1s. 8d. per therm. Contracts existed in many cases, but the board had considered it desirable to introduce a measure of uniformity throughout the board's area, on the same general principles as applied for domestic consumers. The board had, therefore, decided that, subject to existing contracts, the prices to be paid by all local authorities supplied by a gas manufacturing unit should be as follows: Unit production of more than 100 mill. cu.ft. per annum, 9d. per therm; less than 100 mill. cu.ft. per annum, 10d. per therm. Contracts as they expired would be renewable on the revised prices.

Dr. **Edwards** said the price of appliances and installation costs had been carefully studied and in connection with installation costs these were arrived at by the taking of the costs of the same work in various group areas and the average was considered as the correct installation charge.

Implied Contracts

Alderman **T. R. Bottomley** (Brighouse) asked what was the position of a gas undertaking which had an implied contract with a street lighting authority for the supply of gas. Dr. **Edwards** said he would seek legal advice on this question and report at the next meeting.

Dr. **Edwards** said the street lighting charge of 9d. and 10d. per therm was a very fair price. When the various undertakings were handed over it was found that some undertakings sold gas to three or four other undertakings and had a different price for the supply to each undertaking; these prices in some cases were at cost and it was unfair to do that at the expense of the private consumer.

In reply to a question on simple hire, Dr. **Edwards** said there would be no new simple hire contracts; existing simple hire contracts would continue.

Mr. **T. W. T. Hammerton** (Hull) asked why hire purchase was limited to three or five years and what was the position of a hirer who moved from one locality to another.

Dr. **Edwards** replied that within the North Eastern area hire purchase could be transferred from one undertaking to another and he hoped before long that a hire purchase agreement would be transferable anywhere in the country.

On the question of large hire purchase terms, Dr. **Edwards** said a longer term of hire purchase would tie up the board's finances unduly and because of the large influx of orders it was not practicable to increase the term of hire purchase more than five years. The board would like to see all consumers buying their appliances outright.

Dr. **Edwards** said the area board was hopeful that the consultative council could in future be accommodated at the head office of the board in Bridge Street, Leeds.

Annual Dinner of the Institute of Fuel

At the annual dinner of the Institute of Fuel, held at the Connaught Rooms, London, on Oct. 13, the Melchett Medal was presented to Sir Frank Whittle, pioneer of jet propulsion, by the President, Dr. **D. T. A. Townend.**

Later, in proposing the toast of the guests, Dr. Townend expressed pleasure at the company, as principal guests, of Lord and Lady McGowan. Lord McGowan had ties of long standing with the Institute, having been a life-long associate of its Founder-President, the first Lord Melchett, and having himself served as President. The great company, Imperial Chemical Industries, Ltd., over which Lord McGowan presided, had set an example in the development and application of new methods for the better utilisation of fuel, a field in which the work of the Institute lay.

Responding to the toast, Lord **McGowan** emphasised that the correct use of the nation's limited fuel resources was of cardinal importance to our future prosperity. In the past, coal had been our main capital asset, but we had tended to use it wastefully, and we were now faced, not only with an insufficient volume of production, but with costs which had risen out of all proportion to the general increase in prices. The shortfall in production had entailed a serious loss of exports which would have helped to balance our overseas trade. The results of the coal crisis of 1946-47 would have been far more damaging to the national economy but for the improved efficiency of coal consumption which had been achieved as the result of the fuel economy campaign, in which the members of the Institute of Fuel played so notable a part. Although coal consumption was today no more than in 1938, industrial production had greatly increased, despite the fact that a good deal of the coal now being supplied had a lower calorific value. Much remained to be done in fuel economy, and here he was sure that the Institute would continue to give a lead. Industry should be far quicker in applying new knowledge to both design and process work, and this would be helped by the Institute's plan to publish a series of reviews of progress in fuel technology.

In conclusion, Lord McGowan congratulated the Institute on the establishment during the past year of a London headquarters building of its own, made possible by the generosity alike of large corporations and individual members, and inspired by the untiring efforts of Sir Ernest Smith.

Following an Approach by the East Midlands Gas Board, it has been recommended that Chesterfield Corporation should undertake the collection of gas accounts with rates and other charges subject to satisfactory terms being agreed with the Board.

A New Block of Flats in Forty Lane, Wembley, designed for the Wembley Borough Council by Mr. R. Atkinson, F.R.I.B.A., has been officially opened by the Mayor and Mayoress. The hot water supply throughout the 42 flats is provided by the Ewart M.210 multipoint geyser.

PUBLICATIONS

The Principles of Scientific Research, by Paul Freedman, Macdonald & Co. (Publishers), Ltd., price 15s. Those embarking on research work will find their task easier as a result of reading this book, which deals with the subject exclusively and as a whole. Business executives connected with research work will also find the book of great value, as will those concerned with every type of research association.

Scientific Autobiography and Other Papers, by Max Planck (translated from the German by Frank Gaynor), Philosophical Library, New York, price $3.75. The essays that make up this book deal with problems which for many decades beset the mind of this great physicist, such as true and fictitious issues in science; physics and causality; natural sciences and the religious world. The author tells a fascinating story of his own personal and scientific development.

The annual report of the Council of the City and Guilds of London Institute for 1948 records continued progress in the Institute's activities. There was a large increase in the number of entries for the technical examinations held by the Department of Technology, including an increase from 941 to 1,165 in the number of candidates for gas fitting. The accounts show an excess of expenditure over income of £1,930 and the report says that whereas the income from the Institute's subscribers is still far below what it was in the early days, the work being carried out in the City and Guilds College and the examinations of the Department of Technology have multiplied manifold, the balance being borne by University grants and the fees paid by the candidates respectively. The need for increased subscription income, however, is more urgent than ever, due to the post-war recognition of the national importance of technical education and to the need for enlarged staffs and accommodation.

The East Midlands Gas Consultative Council has decided to increase the membership of its Nottinghamshire and Derbyshire divisional committee from three to eight, to include representation for Newark, Mansfield, Ilkeston, Ashbourne, and Burton-on-Trent. Membership of three other divisional committees will be increased: Lincolnshire, from four to nine, to provide for representatives from Skegness, Boston, Spalding, Grimsby and Gainsborough; Leicester and Northants, from three to seven, to include representatives from Melton Mowbray, Oadby, Kettering and Wellingborough; Sheffield and Rotherham, from six to nine, to include representatives from Retford, Doncaster and Rotherham. Local authorities, chambers of commerce or trade and other public bodies have been invited to submit nominations for these positions.

Road Maintenance in the Shetland Islands

The well-attended meeting of the officials and workmen of the Roads Department of the Zetland County Council, which was held at the Garrison Theatre at Lerwick on Oct. 5, testified to the keen interest evinced in the welfare of the roads of Shetland. Among those present were Mr. W. Thomson, Convener, Mr. J. Jamieson, Roads Chairman, and Mr. F. B. Dryburgh, M.I.MUN.E., County Road Surveyor.

The meeting was arranged by the British Road Tar Association jointly with Scottish Tar Distillers, Ltd., Falkirk, for the purpose of showing the Association's film, 'Surface Dressing with Tar,' followed by a lecture on the same subject illustrated by lantern slides. The film was introduced by Mr. W. E. Cone, Technical Adviser, British Road Tar Association, who afterwards dealt with the practical aspects of surface dressing work. Mr. Wm. McFarlane, and Mr. F. M. Potter, Directors of Scottish Tar Distillers, and Mr. Ross, of the same firm, also attended the meeting.

In introducing the film, Mr. **Cone** said that in these days of economic stringency, the efficient maintenance of roads is a problem which is exercising the minds of all highway authorities. The obvious need is to secure the greatest measure of conservation of the existing network of roads by methods which are inexpensive in labour and materials, and so obtain the desired economy. With a complete appreciation of this important matter, the Department of Scientific and Industrial Research and the B.R.T.A. decided to make more widely known the improvements that could be brought about in the technique of surface dressing with tar.

Mr. Cone in his lantern slide lecture brought out many points of practical interest which require a great deal of art and craftsmanship in order to get the best results.

A good discussion ensued in which Mr. Dryburgh, County Road Surveyor, and others took part. It was a pleasing feature to find so many of those engaged on the actual work of surface dressing participating in the discussion. Mr. Cone replied to the questions, after which he accorded a hearty vote of thanks.

The meeting adjourned for refreshments at the Education Office, Lerwick, which function was presided over by Mr. **Thomson,** who expressed his thanks and appreciation of the arrangements made by the British Road Tar Association and Scottish Tar Distillers for the meeting to take place. Mr. **McFarlane,** who is also a member of the Council of the British Road Tar Association, responded.

The Next Examinations of the Institution of Heating and Ventilating Engineers for graduateship and associate membership will be held in London and the provinces on April 22, 1950. New applicants must submit a completed proposal form for membership by Dec. 31, and applicants who have been accepted as examination candidates must submit an examination application form before Feb. 28, 1950.

TOWARDS NONENTITY

Sir Andrew McCance on the Removal of Incentives

THE 34th annual general meeting of the Coke Oven Managers' Association was held at the Waldorf Hotel, London, on Thursday last, the outgoing President, Mr. **G. M. Nave**, occupying the chair at the start of the proceedings.

The report of the Council explained that the financial position of the Association has been restored and that the work on educational matters has been fully justified. Membership at September 30, 1949, was 507, consisting of 15 hon. members, 10 life members, 156 members, 231 associate members, 65 associates, and 30 students. The session has been noteworthy in that the British Coking Industry Scholarship scheme was inaugurated. A joint Scholarship Committee comprised of representatives from the British Coking Industry, the National Coal Board, and the Coke Oven Managers' Association was set up and the first 11 scholarships under the scheme were awarded. These scholarships are tenable for three years at British universities generally in the faculties of chemical engineering, and the students will, on the completion of their degree course, carry out a two years' practical training period in the industry. Mention was also made in the report of the prize of £25 offered by Mr. G. J. Jackson, formerly of the Woodall-Duckham Company, for the best paper on the operation of a coke oven plant. Eight papers were entered for the competition, and the award was made to Mr. H. S. Illingworth for a paper on the oil washing of coke oven gas under pressure.

Following alterations and amendments of rules of membership, adopted on the proposition of Mr. **W. Jeffrey,** seconded by Mr. **G. H. Harrison**, Mr. Nave vacated the chair in favour of Mr. **A. H. Winspear**, President for 1949-50, who gave his address. This will be found on later pages of our issue today.

The annual dinner of the Association was held in the evening at the Waldorf Hotel, Mr. **Winspear** presiding. The toast of 'The Coke Oven Managers' Association' was proposed by Sir **Andrew McCance**, D.SC., F.R.S., President of the Iron and Steel Institute, who was the principal guest. Sir Andrew spoke of the fruitful work carried out by the Association, mentioning particularly the research and investigation undertaken by the British Coke Research Association. He laid especial stress on the need for prosecuting research on the mechanism of coking, on the elucidation of the properties of the 'coking element' of coals. They were well aware that the resources of coking coals were strictly limited; and if they could discover means of converting a non-coking coal into a coking coal that would indeed be an achievement of major value. The iron and steel industry was, of course, intimately bound up with the coking industry. The iron and steel industry depended for its success on the supply of good coke. Continuing, Sir Andrew remarked that the prosperity of the iron and steel industry was traceable to men of inventive genius whose work was inspired by incentive and reward. He mentioned, for example, the names of Bessemer and Siemens, whose work, fostered and encouraged by enlightened men of business, had helped to create an era of success for Great Britain and, indeed, an era of prosperity for countries beyond the seas. In the past, incentive was such as to ensure that the flame of prosperity burned high. Today the tendency was to remove incentive to endeavour; and the removal of incentives could result in one thing only—industrial nonentity. The danger facing every young man today was that the full power of Government, with its multitude of controls, would stifle endeavour and dissipate energy. Such a policy, concluded Sir Andrew McCance, could not possibly be right.

Replying to the toast, Mr. **Winspear** commented on the responsibility of the coke oven manager to ensure that iron and steel industry got at all times a supply of coke of the requisite quality to keep the production line going continuously. And on the question of quality, not so very long ago the average blast furnace manager really did not know what type of coke was best suited to his needs. That position, however, had been changed; today, the blast furnace manager bought his coke to specification, but they had to bear in mind that fundamentally both the iron and steel industry were dependent on the coal industry for the quality of coal supplied in the first instance. Concluding, Mr. Winspear emphasised that the coking industry was far from being out of date, though some of the coke oven plants still in operation, undoubtedly out of date, were sadly in need of reconstruction. By and large, however, the records, the very fine records, of the iron and steel industry were due to the fact that the coke oven managers were playing their part in delivering the goods without fail.

The remaining toast, that of 'The Guests,' was submitted by Mr. **J. L. Lambert**, Vice-President of the Association, response being made by Mr. **L. O'Connor**, Director of Carbonisation, National Coal Board.

Midland Juniors at Retford

'IN our extensive works you will meet real craftsmen produced by the grand old country firm of Jenkins,' said Mr. R. M. Goodman, Managing Director of W. J. Jenkins & Co., Ltd., in welcoming the Midland Junior Gas Association to the Beehive Works, Retford, last Thursday. And in the subsequent tour of the shops it was obvious not only that Jenkins employ real craftsmen, but that the latter are happy in their work and enjoy membership of a firm who look after their welfare, give them a share in the profits, and have a waiting list of trainees from local families rooted in this private enterprise. Such trainees are absorbed from the works into the drawing office, where technical education at day colleges forms part of their duties. A system of piecework operates throughout the factory, which again was obvious to the visitors.

A Brief History

The Company was founded in 1896 when the late Mr. W. J. Jenkins bought a small engineering works in Retford which had been in existence for many years as millwrights. Very little of the old works now remain, and those buildings that are left will be demolished to make room for further extensions. Retford was selected on account of its excellent position at the intersection of the old Great Northern and the Manchester, Sheffield and Lincolnshire Railways and its position on the Great North Road.

Initially the business was horizontal retort benchwork and mechanical handling plant, and this led to the acquisition of the patents of the D. B. stoking machine, the design of which was a considerable improvement on all existing types, providing, as it did, means of putting the heaviest charges into through horizontal retorts. The response by the gas industry was immediate and altogether some hundreds of these machines have been supplied to works all over the world. It is interesting to note that machines installed by Jenkins in 1905 and 1906 are still in operation, and orders for spares are dealt with readily from the accurate records which have been preserved. Parallel to the introduction of the charging and discharging machines came the call for the mechanical handling of coke. This was answered by the De Brouwer conveyor —a simple design which has withstood the test of time. Many thousands of feet are made every year.

Contracts for horizontal and inclined retort benches and complete coal and coke handling equipment became the established business of the firm, and the industry suffered a great loss when Mr. Jenkins died in 1911. His progressive outlook has, however, always been maintained, and the activities of the Company were considerably widened by the introduction in 1931 of the intermittent vertical chamber oven system of carbonisation. This system, giving as it does freedom in the selection of coals, is rapidly coming to the forefront, and contracts in hand at the present time total a capacity of 20 mill. cu.ft. per day.

Design What You Want

Before the tour of the works, lunch was served in marquees in the garden. Mr. Goodman made the one speech, welcoming the Association whose President, Mr. S. C. Bentley, was Engineer and General Manager at Oxford—'one of their oldest and most respected

(*Continued on p. 232*)

The Virtues of Consultation

Consultation in the coal mining industry has been of great value, said Sir Hubert Houldsworth, K.C., Chairman of the East Midlands Division of the National Coal Board, last week. Sir Hubert, whose challenge to mining engineers in his recent speech to the Coal Industry Society created widespread interest, was addressing a conference on Human Relations in Industry in Nottingham. Joint Consultative Committees, he pointed out, have helped in developing understanding between those with management duties and those representing workmen.

'They have got to know each other more intimately, to understand each other better and to have greater trusts in each other's judgment and reliability,' he said. 'It has given management an opportunity of discussing problems and difficulties, of explaining contemplated changes, the reasons for such changes, and the beneficial results anticipated from them. It has given the workers an opportunity of putting forward constructive suggestions, and to discuss their problems with the management. In other words, those on the committees have had an understanding of the needs and a readier acceptance to change has followed from such understanding.'

The Annual General Meeting and Autumn Meeting of the Society of British Gas Industries Golfing Circle was held on Oct. 19 at Fulwell Golf Club. Mr. C. R. Averill was elected Captain for the ensuing year. The Yates Bowl was won for the second year in succession by Mr. J. Simpson, with a score of one down. The Greensome Foursomes played in the afternoon were won by Mr. C. R. Averill and Mr. S. Clayton Thomson, with a net score of 78.

Midland Juniors (*concluded from p. 231*)

clients.' Mr. Goodman painted the highlights of the coming tour, one of which was No. 12 of a series of large and perfected machines for Beckton. This was but one example of special design and development for a special purpose—expensive, yes, but not prohibitive in relation to a retort house producing some 4 mill. cu.ft. of gas a day. Mr. Goodman emphasised his firm's preparedness to design what an undertaking required and their policy of close co-operation with their customers at every stage. Jenkins was not a mass-production firm; only the D.B. chain was so produced.

In replying, Mr. Bentley fully corroborated these points, and referred to the courtesy and friendship which was always offered and which was so refreshing in these days of restrictions and much paper. He said that Jenkins had made remarkable progress not only in handling, but in horizontal and intermittent vertical plant.

Telegrams of greeting were read from Mr. W. Morland Fox, Technical Director, who is at present in New Zealand on the firm's behalf, and from Mr. Ken Clark, London Manager, who was prevented by illness from being present.

Gas Grid for Clydeside

It was announced last week that the first stage in the development of a gas grid for Clydeside—the linking of Dumbarton, Helensburgh, and Vale of Leven with Glasgow at a cost of about £1,250,000—had been authorised by the Scottish Gas Board.

Dumbarton, Helensburgh, and Vale of Leven are already linked, and the new development will permit manufacture to be concentrated in larger and more efficient units and where the demand is greatest. The ability to transfer gas between the areas will, it is stated, considerably reduce the amount of capital employed in the provision of auxiliary plant and give greater flexibility to meet sudden increases in consumption.

The grid will embrace the supply areas between Gartcosh and Ballieston in the east, Eastfield and Burnside in the south-east, Newton Mearns in the south, Milngavie and Bardowie in the north, and will extend to the west as far as Faslane, Garelochhead in the Helensburgh district, and Balloch in the Vale of Leven district. The area covered will be some 170 square miles.

The initial development allows for the installation at Dumbarton gas works of modern manufacturing plant to produce an additional 6 mill. cu.ft. of gas per day to the 2 mill. cu.ft. at present produced. This plant will meet the increasing needs of the Dumbarton district and supply Helensburgh, where the existing gas works will be closed. Any available surplus will be compressed and pumped to the Glasgow district by a new high pressure transmission line, and it is estimated that the additional supply will be available late in 1951.

Seven miles of 18 in. piping will be used to link Dumbarton with Glasgow, where other developments are planned to supplement the present daily output of 45 mill. cu.ft. Orders have been placed for carburetted water gas plant for the Dawsholm gas works, and for the extension of the coal carbonising plant at Tradeston. These developments will increase production by a minimum of 7½ mill. cu.ft. per day and at Dawsholm will be in operation in two and a half years. The Tradeston project will take five years to complete.

As a Result of negotiations with the Ministry of Fuel and Power the compensation value for the 4½% debenture of the Arundel Gas Company has been agreed at £113 per £100 of stock. Compensation values have also been agreed between the Ministry and East Cowes Gas for the 4% debenture of £102 per £100 of stock and the original ordinary of £210 per £100 of stock.

Total Output of coal for the week ended Oct. 15 amounted to 4,334,900 tons, compared with 4,338,600 tons in the previous week. The number of workers on colliery books for the week ended Oct. 8 showed a further decline of 1,200 over the previous week, but the number employed at the face increased by 100. Gas available at gasworks for the week ended Oct. 14 was 9,140.5 mill. cu.ft., and 834.9 mill. units of electricity were sent out in the same week for public supply.

Coal Tar Research Association

At the first annual general meeting of the Coal Tar Research Association, held in the Euston Hotel, on Sept. 28, encouraging information was given about the progress of the new Research Station at Gomersal.

The work of conversion of what was formerly a small arms ammunition factory into research laboratories, stores, workshop, offices, canteen, &c., started early this year and is now nearly completed, and in fact some laboratory work has already commenced. Practically the full complement of research staff has been engaged and during the next few weeks a number of members of the staff will be spending periods of a week or a fortnight at the works of various tar distillers so as to acquire, to a small extent at any rate, some industrial background in anticipation of the completion of all the laboratories and the start of research work on a full scale.

The Association is sponsoring extra-mural work at Leeds University, Glasgow Royal Technical College, and Heriot-Watt College, Edinburgh, respectively. Meanwhile the Director, in consultation with the Research Committee of the Council, has drawn up a programme of research work to be undertaken at Gomersal, and this programme has been accepted by the Council. The work involved is based on the practical outlook upon the industry and its present problems. With the exception of that section of the work which will deal with what might be called 'process problems,' the main emphasis is on the search for fresh outlets for pitch and creosote by the application of new techniques.

The technical intelligence and information services are dealing with an increasing number of enquiries, and have issued to members a number of translations of foreign papers.

Dr. E. V. Evans, O.B.E., first President, and Mr. H. H. Bates, Hon. Treasurer, were re-elected for a further 12 months, as were all retiring members of the Council. At a meeting of the Council, held later in the day, Mr. Richard Robinson was unanimously re-elected as Chairman.

In Our Account of the opening of the new display of the Gas Council at the Building Centre, by Sir Edgar Sylvester (*Gas Journal*, October 12, p. 105) we did not mention specifically in the list of exhibitors represented the firm of Radiant Heating, Ltd. The name of this firm should have been given under the sub-heading of 'space heating.'

Sir Andrew Clow, chairman of the Scottish Gas Board, accompanied by Lady Clow and Mr. Duncan D. Melvin (full-time member) and Mrs. Melvin, visited the bowling green of the Edinburgh undertaking at Granton on Oct. 1. The occasion was the last playing day of the season for the Bowling Club. Mr. T. Reynolds, President of the Club, was in charge of the arrangements for the afternoon. Lady Clow presented the prizes. The visit was greatly appreciated by all in attendance. Sir Andrew said the Bowling Club's contribution to the welfare of gas employees in Edinburgh was most impressive.

Sulphur Content of Spent Oxide*

SUGGESTED METHOD FOR RAPID DETERMINATION

By L. FASSINA, Paris.
(Translated by Our Own Correspondent)

THE author is of the opinion that the precision of a method of determination to the detriment of its rapidity may reduce its efficiency as a means of control of an industrial process. The revivification of chemical matter used in the purification of town gas may be regarded as the manufacture of the black sulphur removed from this gas. To follow the day-to-day evolution of this sulphur in the purifying material the author has studied two rapid and rigorous methods of sulphur determination and that of tar which he describes and discusses in the following paper.

The classic method: This is generally carried out with a sample of 3-5 grammes of spent material in an asbestos cartridge in the glass cylinder of a Soxhlet apparatus. 100 cc. of the solvent is passed by siphonage over this sample. The solvent adopted in the gasworks laboratory—on account of its strong solvent action on sulphur—is carbon bisulphide. The sulphur retained by spent and revivified purifying material is almost always black; indeed, the spent material, absorbing H_2S, retains physically the tar fog which has escaped the preceding physical purification. The sulphur contained in the cartridge after extraction is therefore impure, black, because the tars are themselves also soluble in the carbon sulphide. To obtain the pure sulphur content it is necessary to oxidise the residue, the sulphur into SO_2 and the tars into CO_2.

Difficulties of the Classic Method

(*a*) *The Solvent.*—Carbon bisulphide is not selective in the solution of sulphur in the presence of tar. Theoretically 100 g of CS_2 dissolve 20 g of S, 100 cc dissolve 26 g of S (d = 1.29). The sample treated being only 3 to 5 g, one siphonage should suffice to extract all the S. But this is not the case. At least 10-20 siphonages are required to do this because the tars and other impurities lower the solvent power of the CS_2 for S.

(*b*) *Oxidation.*—The oxidation of the black sulphur also presents difficulties. First, it is a long process; the determination as H_2SO_4 as well as Ba SO_4 is delicate. Secondly, there is formed a residue of gums when there is a high percentage of tars. These gums retain a little of the sulphur which thus escapes determination; the figures obtained for sulphur content of the material are too low.

Determination by Sulphuric Ether

To obtain a selective determination of the sulphur and to avoid a diminution of solubility arising from the presence of other bodies equally soluble in the same conditions, it is necessary to have recourse to a solvent which dissolves only sulphur. We have seen that CS_2 does not fulfil this requirement. It is also an advantage to use a liquid with a high solvent power since purifying material is described as rich when it contains 55% of S. Working with a sample of 3 g, for example, one will only have to extract $55 \times 3/100 = 1.65$ g of pure sulphur.

The author has therefore proposed the use of sulphuric ether, which dissolves neither coal tars nor the resins which may exist in wood sawdust. He has observed experimentally that, thanks to its selective solution of sulphur, which, however, takes place only at the rate of 0.188 g of S per 100 g of ether, or 0.26 g per 100 cc, the extraction of S by sulphuric ether is effected as rapidly in the Soxhlet as by CS_2. But this sulphur is pure S and directly measurable after distillation from the solvent.

Determination by Animal Black

To avoid the difficulties inherent in the presence of the tars, it was sought to ascertain conditions which would permit the removal from the spent material of its pure sulphur content without the necessity of the oxidation of a black sulphur. The proposed method is based upon the property of animal charcoal to retain tar and thus to permit the selective solution of the sulphur in the CS_2. About 1 g of animal black is placed in the bottom of the asbestos cartridge, then, previously mixed with 2-3 times its weight of animal black, 2-3 g of the spent material. The weight of pure sulphur in the sample is obtained from the weight of residue in the cartridge. This method involves only weighing and obviates the troublesome oxidation of the tars and the delicate determination of Ba SO_4.

On the other hand, by combining the classical method without animal black with one of the two preceding methods, one can easily deduce the quantity of tar retained.

In conclusion, it is suggested that the rapid determination of pure sulphur by the selective extraction of the two proposed methods affords an effective assistance to the classical method of extracting black sulphur since it permits the observer to follow from day to day the quantity of tars passing through the physical purification process and consequently to control the latter at the same time as the activity of the dry purifying material.

Practical Application

The three determinations described above, the classical method and the two methods proposed in this paper, can be carried out at the same time. Three extraction flasks can be set up in the same bath with a single current of cold water.

Three samples of the material each of about 3 g will be taken. No. 1 cartridge will be extracted with ether; No. 2 will contain the mixture with animal black, for CS_2 extraction; No. 3 will be used with CS_2 alone.

It will be noted:—

That in No. 1 flask the ether will be nearly colourless—an almost colourless sulphur is being extracted. That in No. 2 the extraction is yellow, not blackened, thanks to the presence of the animal charcoal.

That the extraction in No. 3—*i.e.*, the classical method—is slower than in Nos. 1 and 2.

That in No. 3 the CS_2 is dissolving, apart from the sulphur and the tars, an aniline colour of an intense yellow contained in the tar fog. Consequently, in an extraction by the classical method and in the presence of a high tar content, the solvent in the tube of the Soxhlet may remain yellow for a very long time after all the S should be extracted. Thus, if to determine the end of the extraction one relies on the colour of the liquid in the tube, the presence of this yellow colouration may uselessly prolong the process.

Using the three methods simultaneously one can easily compare the times required for:—

(a) the classical extraction of black sulphur and the determination by transformation into Ba SO_4,

(b) one of two proposed determinations of pure sulphur.

The comparison will be all in favour of the two proposed methods.

* Chimie et Industrie, Vol. 59. No. 4, pp. 350-356.

OPPORTUNITIES IN THE COKING INDUSTRY*

By A. H. WINSPEAR, M.Inst.F.

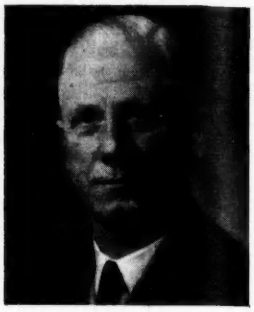
***EDITOR'S NOTE*:—The author refers to the 'alarming' rate at which high quality coking coal is being mined, the while some of our best coking coals are being allowed to go on to the free market and to be sold for export. He strongly advocates the more extensive application of blending in coking practice, transporting weaker coking coals to areas where strong coking coals are mined and carbonised.**

OUR primary concern a year ago was to adjust and stabilise the financial position of our Association. The alteration to the rules, which widened the scope of admission, the increase in the annual subscription, and the generous support of many of our friends have by this time enabled us to balance our budget and proceed with our activities. In spite of many temptations during the recent transfer of almost half of our industry to national ownership, we have preserved our identity as a purely professional body. This decision was reached after much deliberation by your council, who considered that the welfare and future of the Association were bound up in maintaining complete freedom from influence of any description.

One of the most progressive interests of our Association is that of the education and training of newcomers to the industry. During recent years three of our members, Mr. Nave, Mr. Jeffery, and Mr. Finn, have given of their time and knowledge in collaborating, as representing the Association, with the N.C.B. and subsequently the Iron and Steel Federation, in forming the British Coking Association Scholarship Scheme for those desirous of making the coking industry their career. This work is now bearing fruit and it is gratifying to know that over 200 applications have been received for awards under this scheme. The work our representatives have done and the results obtained merit our very sincere thanks and appreciation. This educational scheme is but the first step in attracting suitable personnel to the carbonising industry, but when we have succeeded in reaching that objective we must consider how these candidates are to be encouraged to remain in the industry when trained and experienced. The responsibility for the ultimate placing of these trained men does not rest with our Association, but it is our right and indeed our duty to submit to those whose business it is to appoint personnel that they should make the conditions of contract sufficiently attractive. It is well known to many of us that in the past competent and well trained chemical engineers have found it expedient to forsake the coking industry for more progressive engagements in other fields. Recruits should be given the assurance that, provided their ability and accomplishments merit it, they may rise to the highest executive positions.

Interworking with the Gas Industry

The transfer to national ownership of the gas industry has taken place during the past year, an act which has very close connection with our interests. The potentialities now presented in the shape of inter-working with the gas industry have very great bearing on the future policies and economics of coke oven practice. The manufacture of base load gas by coke ovens has become accepted practice in some of the largest London gasworks; indeed, in several parts of the country the gas grid base load is very largely the responsibility of our industry. For many years now the supply of bulk quantities of gas to gas undertakings has been one of our major interests and, reviewing the position impartially, we can feel proud of our stewardship. In the not very distant future we may hope that 'surplus' gas will no longer be a designation of coke oven gas. The negotiation of gas contracts in the past has naturally been the concern of the individual undertakings, with the consequent result of wide variation in prices and conditions of supply. It should now be practicable to standardise all these agreements and fix a fair and equitable price for this valuable product of our industry, and one which is satisfactory to both producer and distributor. It may not be inappropriate at this time to repeat the plea for standardisation of gas specification throughout large areas of the country, having special regard to the declared values. If this were done, the extension of bulk supplies from individual coking plants to several gasworks would be simplified. The whole of our finished by-products are sold to a standard specification, and it is time now that consideration was given to a similar national basis for gas deliveries.



Mr. Winspear was educated at the Woodhouse Grammar School, Sheffield, and Sheffield University. He received his early training with the Tinsley Park Colliery Co., Ltd., Sheffield, and was later appointed Assistant Coke Oven Manager. After 27 years with the Company he was appointed Coke Oven Manager with the Clay Cross Co., Ltd., in 1941, and joined the Staveley Iron and Chemical Co., Ltd., in the same capacity in 1946.

During recent years the demand for coke oven gas has increased and it naturally became the objective of the coke oven engineer to take steps to meet the calls made for this rich gas. This has resulted in the extended use of low grade fuels for under-firing, and the compound oven is now accepted as the standard type of construction in this country. The availability for use of blast furnace or producer gas for oven heating has materially contributed to the flexibility in quantity of coke oven gas which can readily be supplied to meet seasonal demands and peak loads made upon the gas distributors.

The great waste of coke oven gas at week-ends and during holiday periods has worsened as a direct result in industrial areas of the advent of the five-day week, with the consequent closing down of many industries which are essentially large consumers of gas. While appreciating that some of this available gas is used for steam raising purposes where facilities exist, it would appear that there is great scope for collaboration with the now nationally-owned electricity undertakings. Two alternatives might suggest themselves—to arrange for deliveries of gas to existing power generating stations, or to install generators of suitable capacity at the coke ovens, which would consume available gas and deliver power into the electricity grid with a consequent saving of solid fuels.

A Great Opportunity

Now that both gas and electricity undertakings are nationally owned, a great opportunity presents itself for the two industries to dovetail their planning and, in the national interest, utilise to the best advantage the large quantities of coke oven gas which are frequently available, and at the same time to make provision for the complete absorption of the still larger quantities which will be produced when the re-organisation of the carbonising industry is accomplished. The era of gas versus electricity should now end with both industries making full use of each other's resources to give best possible service at the lowest possible costs. In addition to healthy competition, the time is ripe for stimulated co-ordination.

*Presidential Address to the Coke Oven Managers' Association. London, October 20, 1949.

The major object of our industry, however, is the production of coke chiefly for metallurgical purposes; hence we are deeply interested in the future of the iron and steel industry. Whether this is to become nationally owned or remain in private ownership is still a matter for conjecture but, whichever occurs, the inter-dependence of the two organisations will continue.

The results which are being obtained by the iron and steel industry generally are materially assisted by the quality of the raw materials delivered to them. Not least in their requirements is a good, clean, strong metallurgical coke. Primarily, our concern is to meet the requirements of the blast furnaces. After long experience, much research and consideration, a specification has been submitted by the blast furnace experts which is considered the optimum for efficient furnace operation. One is bound to admit that no extreme limits have been fixed and the requirements should be attainable, but it is essential that the fuel supply for coking should be of such a grade as to make the coke specification possible within limits. It should be noted, however, that, should this specification be improved upon, and even better quality coke supplied, the results obtainable in the blast furnace would be greatly improved. Coke represents the major cost of any of the raw materials charged into the blast furnace and anything that can be done to reduce this cost in the manufacture of iron is beneficial to the steel industry generally.

The urgent problem of efficient coal preparation is one which we know is fully appreciated by the N.C.B. and no doubt in time adequate coal cleaning plants will be erected to fulfil carbonising engineers' requirements. However this may be, the long-term fuel policy of the N.C.B. is a vital one so far as our coking coal resources are involved. It is grievous to think that in this chemical age some of our best remaining coking fuels, which are so rapidly being mined and exhausted, are still allowed to go on to the free market for almost any and every use. At the same time some of this most valuable coal is being shipped abroad, whereas if it were processed in this country and the products of carbonisation were refined and prepared for export this great source of wealth would be of much more value to the nation.

Blending

The alarming rate at which the high quality coking coal resources of this country are being mined is, from a national aspect, a very serious one and demands that action should be taken to prolong the life of the rapidly diminishing coking seams. Much has been written in the past of coal blending, but only in rare instances has the necessary plant been installed for this important purpose, and it is imperative that this urgent problem should be fully explored. The blending of coals to improve the physical properties of the coke has met with great success in the Midlands, where good coking coal has been added to the weaker coking slack, with a vast improvement in coking strength. The expansion, therefore, of this proved system is urgently called for wherever it may result in greater output and better coke. Further, is it not practicable to transport quantities of the weaker coking coals to areas where strong coking coals are mined and, by predetermined blending, still produce highly satisfactory metallurgical coke, thus contributing to the conservation of supplies of best coking coal? It would appear that there is scope for a great deal more research work on the blending and up-grading of coals.

In the early days of the coking industry in this country it was usual to find coke ovens situated solely at the pit head. The trend of developments later was for these to be installed at iron and steel works. As they have also become recognised gas-making plants in gasworks, there are now three distinct sections:

(*a*) Coke ovens attached to steelworks or blast furnace plants, whose function is to produce metallurgical coke.

(*b*) Coke ovens attached to gasworks, where the primary product is, of course, gas.

(*c*) Coke ovens owned by the N.C.B., which may well be required to supply a fluctuating amount of metallurgical coke and, when the position warrants it, to make industrial and domestic coke.

The various commitments to be met by these plants necessitate supplies of coal suitable for the products required.

There is no doubt whatever in the minds of the technicians whose duty it is to maintain supplies at maximum efficiency that all demands can be satisfactorily met providing the carbonising engineers are allowed to assist in the selection of the raw material to be used. In this matter the members of our Association will give of their knowledge and experience in investigating and advising on any of the problems that may arise on the question of coal supplies.

One is prompted to ask what is to be the position of the coke ovens attached to iron and steel works under the proposed nationalisation scheme. That the carbonising plant is an integral part of the whole works has been proved without doubt, and it is to be hoped that, should the steel industry eventually come under public ownership, the position of the control of the attached coking plant will be unaltered in the best interests of the industries concerned.

Chemical Utilisation

Many presidents in the past have referred to the chemical utilisation of coal by way of coking. The position appears to have been profoundly altered by the home refining of petroleum. The possibility of producing ethylene is perhaps the only really good chemical reagent that could be envisaged and this product supplied to the petroleum industry for the purpose of the manufacture of chemicals.

The reconstruction and re-organisation rendered so urgent as a result of the war years and the wear and tear of time and service are proceeding perhaps not so rapidly as could be desired. There is, however, the very serious problem of increased capital cost for all new plant and materials. It is therefore necessary that all proposals should be carefully scrutinised and studied. At the same time, these delays may, in the end, cause serious dislocation of coke and gas supplies if carried to excess. It is therefore most desirable that urgent replacements should proceed and include all the latest designs in modern practice, these being incorporated without unnecessary and expensive housing and embellishments.

The Government's intention to implement the Simon report may eventually have great bearing on the future policy of the coking industry. It has been established that the modern coke oven can produce a smokeless fuel which can be adapted for many uses. The research which has been proceeding for many years in the design of coke burning appliances, together with the many new uses which have been found for coke, will ultimately absorb much of the solid fuel manufactured in high temperature coke ovens.

According to figures published in *Chemische Industrie* (Düsseldorf), production of heavy chemicals in the German Bizone during the past two years included the following:—

	1947 tons	1948 tons
Sulphuric acid	421,803	621,049
Hydrochloric acid	27,026	45,631
Soda ash	232,385	377,315
Caustic soda	89,699	155,321
Calcium carbide	215,355	334,461
Sodium sulphate	54,706	71,694

The sulphuric acid totals cover also oleum and are in terms of the SO_3 content. The hydrochloric acid figures are in terms of 100% material. The soda alkali figures are in terms of Na_2CO_3 and NaOH respectively, and the sodium sulphate figures are in terms of the anhydrous material. Of the sulphuric acid made last year 507,297 tons were by pyrites roasting and the balance from sulphur gases produced in metallurgical operations. German chlorine production last year was 98,804 tons. Further output expansion by the Bizonal chemical industry was prevented mainly by the coal shortage.

OPPORTUNITIES UNDER AREA BOARD CONTROL*

By S. C. BENTLEY, M.Inst.Gas E.,
Engineer and Manager, Oxford and District Gas Undertaking, Southern Gas Board

***EDITOR'S NOTE*:—The author considers that under nationalisation there should be ample opportunities for advancement among keen and able young men in the gas industry. Rapid promotions, he says, were always more prevalent in the larger undertakings, where the worth of a man was known to many and vacancies were regularly occurring, than in the smaller undertakings, where more often than not a good man could seek advancement only by moving elsewhere. The area boards, he adds, will appraise the qualifications and capabilities of all their staff members, in the small units as well as the large, and consider for advancement many whose prospects might otherwise be strictly limited.**

THE advent of nationalisation has led the various District Associations to consider their position and future status with the result that some have sought closer ties with the Institution of Gas Engineers and the status of district sections of the Institution. The Institution has been sympathetic to these requests and in collaboration with the District Associations is expected to adopt a procedure and special rules for the formation of district sections.

In most of the reported discussions the position of the Juniors has been mentioned as needing careful study, primarily with a view to associating the Juniors very closely with the new sections, and one can read into the tentative proposals an intent to form a real junior or student section of each District Section in which obviously the Juniors' Joint Council would have no part. That would be the end of the virile, progressive, and adult juniors as we know them. They would lose their individuality, their self government, and their freedom of action. They would no longer attract the men who have completed their studies but have not attained senior status, and the tendency would be for all men qualified to join the senior section to do so. Many of our members now belong to the Senior Association but owing to their positions are unable to attend the meetings regularly and can hardly anticipate taking office while still young. Their numbers would increase if we reverted to a student section and they would be denied the facilities they now enjoy with us.

Others who would not be attracted to student sections and yet are not qualified for membership of a district section are the technical and commercial assistants who have progressed from humbler beginnings, without taking the recognised educational courses, but by diligence have earned promotion and have qualified for membership of a Junior Association. The opinions of such men are always valued in our discussions.

It would be wrong to say that student sections of district sections of the Institution would be valueless. The Institutions of Mechanical and Civil Engineers support student sections of District Branches to the benefit of the students and the Institutions. Similar sections could be sponsored by district sections of our Institution but for students only, with an educational qualification for membership, an age limit, and programmes prepared by the senior section closely related to the Education Scheme of the Institution or integrated with the training schemes which will, in due course, be operated by the area boards.

The Junior Gas Associations, with their broader qualifications for membership, should, however, continue as an independent body of gas technologists, regularly constituted and affiliated as at present to the Institution.

The system of a number of autonomous associations with independent rules and a Joint Council of chief officers might be strengthened by the creation of a single association with a constitution, rules, and membership qualifications agreed by the present associations and with branches throughout Britain broadly covering the existing areas. A president and council would govern its affairs and each branch would have elected officers and a management committee to conduct its business and manage its finances based on a common subscription fixed by the council.

Mr. Bentley was promoted in June this year from the position of Assistant Engineer to that of Engineer and Manager of the Oxford and District undertaking, which is the principal of the three groups in the Northern Division of the Southern Gas Board. He succeeded Mr. Alexander Tran on his appointment as General Manager of the Division.

The ties with the existing parent district associations are too valued to be broken by any change in their constitution or ours and they could easily be retained by drafting into new constitutions facilities for the affiliation of branches of the juniors to their respective district sections of the Institution.

Members of a reorganised junior association might be students of district sections of the Institution or members of sections or not belong to them at all, thus preserving the wide cross-section of the personnel of the industry which they now represent, but in an endeavour to maintain or improve the status of the association all candidates for membership should strictly possess the desired qualifications and be approved by the central council.

In the past, gas undertakings have encouraged the Junior Associations by granting facilities to their staffs to attend meetings and visits, by contributing to members' expenses in some cases, by inviting them to visit their works, and by releasing information for inclusion in papers. These favours are now the prerogatives of the area boards and we welcome the interest already shown and the promises of support already given. But whereas individual undertakings have neither directed nor attempted to influence the work of the juniors, the boards in their more collective capacity could well be actively associated with the movement without prejudicing its independence.

New Opportunities

The British Gas Council pledged the industry to assist the change of ownership of the industry, and from the time that nationalisation became irrevocable that pledge has been honoured. In every way the personnel of all undertakings have loyally given of their best to make the change-over as smooth as possible, despite the extra work involved.

Many have not been affected. No such change lessens the need to control combustion chamber temperatures or watch Sunday morning pressures. Others have been engaged

* Presidential Address to the Midland Junior Gas Associations, Birmingham, October 11, 1949.

in the preparation of reports, estimates, records and drawings in order that the boards and divisional managers may obtain the information necessary for them to carry out their duties. Others at higher levels have had the problem of building up engineering, commercial, and accountancy organisations, with corresponding staffs for area and divisional duties, divorced from the day-to-day workings of individual undertakings.

A long tradition of service to the industry and to the consumer is inherent in us all and will continue unaffected by political decisions concerning the ownership of the industry, and those whose prospects have not immeditaely changed will continue to give that service and await their own opportunity. Opportunity is a fine circumstance; it may not come often but it can often be found by questing, the lodestone being ability. It may be asked how nationalisation will create new opportunities now that the first spate of promotions due to the establishment of area and divisional staffs is subsiding. The answer lies, I think, in the formation of relatively large groups of undertakings and in the intention of the boards to fill all staff vacancies as far as possible from their own areas. Rapid promotions were always more prevalent in the larger undertakings where the worth of a man was known to many and vacancies were regularly occurring, than in the smaller undertakings, where more often than not a good man could seek advancement only by moving elsewhere. Obviously the boards will appraise the qualifications and capabilities of all their own staff members, in the small units as well as the large, and consider for advancement many whose prospects might otherwise be strictly limited.

The specialist was also at an advantage in the large unit where he could develop his own subject fully, not having to concern himself with detailed work outside its scope. Here the differing organisations in different board areas affect opportunities. Most boards have formed divisions within their areas, each under the control of a divisional manager but, in addition, some have set up central specialist staffs while others, aiming at decentralisation to the fullest extent, have limited area and divisional staffs to legal, secretarial, and accountancy work, leaving local management, technical and commercial work to group and unit staffs. In the latter case the specialist has opportunities within the groups previously available only in large undertakings; in the former case his potential position is on an even higher plane.

Area Organisation

The policy of decentralisation appeals to one as an attempt to retain the individuality of local undertakings, to avoid the bureaucracy usually associated with unified control and to encourage initiative at all levels. It fosters a team spirit in the staff of an undertaking and a competitive spirit between undertakings in the same area, and it strengthens the authority of managers who can readily co-ordinate the activities of all departments of their own undertakings.

It provides the best opportunities for a man to obtain training and experience in more than one phase of the business of manufacturing, distributing, and selling gas, and teaches him to assess the true relationship between these phases, both technically and commercially. It is doubtful if any other profession calls for the knowledge of such a wide variety of subjects as gas engineering and knowledge gained by experience best befits a man for the executive levels in that profession.

Such knowledge is essential for the complete control of an undertaking, and even more so for the control of a division, and if by centralisation local managers are relieved of the need for the wide experience of managers under the old régime, where are the future divisional managers to come from? I believe that men suitable for such positions will only be produced in the future if, by decentralisation of control, they have the opportunity of practising control.

Policies, accounting and costing methods, price structures and employment conditions must of necessity be uniform within an area and therefore centrally determined. Incidentally, uniformity in these matters will enable true comparisons between the working of undertakings to be made which neither profit, costs per therm, nor fuel expenditure indices truly revealed in the past.

Central departmental direction tends to divide an area into vertical strata and inevitably leads to a concentration of high executives with their respective assistants and hierarchies of specialists from area level to units. Each section right down the scale has the benefit of control by an expert, and throughout the area standards of procedure can be identical. If at division, sub-division, and unit levels, however, these hierarchies are channelled through managers, who alone can co-ordinate the work within their area of control, bottlenecks and delays are likely. If such channelling is dispensed with, then divided responsibility and dual control with their attendant evils are possible.

Centralisation abrogates authority, decentralisation delegates authority. A man used to authority, be it as foreman or executive officer, cannot readly reconcile himself to referring apparently minor decisions to a higher level and will be diffident about presenting his own ideas for possible condemnation from above. Good ideas do not always come from higher to lower levels; they frequently ascend—and the credit with them.

The ultimate result of the abrogation of authority is a feeling of frustration in those losing authority. An attitude of *laissez-faire* is scorned by everyone having a progressive spirit, but it is bred by over organisation and can be almost unconsciously assumed. This is already evident in some nationalised industries and is leading to changes in organisation devised to give local authority to local staff.

Our leaders are therefore cognisant of the dangers of damping our enthusiasm and the gas industry has the opportunity of profiting from the mistakes of others in its approach to the problems of re-organisation forced upon it.

Staff Organisations

Conditions of service are outside the scope of activities of the Juniors, but as they are so generally discussed and naturally of the greatest interest, I hope that the following remarks may be deemed relevant.

In serving a common employer gas staffs are more united than ever before, and that sense of unity is evident in the recent rapid growth of the staff and professional organisations. Or is that growth due to a new need for protection not felt before?

We have been used to employers being represented by councillors or directors, acting through our chiefs, but always, in the extreme, approachable. The new employer is the State, represented by geographically remote boards. The dissatisfied could change their employers and yet stay in the industry. That possibility is now ruled out. Terms and conditions will presumably be adjusted to a common basis—and rightly so—and therefore our collective interests need representation.

To be honest with ourselves, however, we must consider just why we join such organisations. If it is in the hope that our monthly subscriptions will lead, without any other effort, to increased salaries, or that union will enable us to coerce our employers, our principles are wrong. The objects of an amalgamation of staffs are to improve and safeguard their common interests, to ensure that each acts fairly to his fellows and his employer, to ensure against the possible results of inept management and to present any views and suggestions for the good of their industry. On such foundations the organisations will flourish to the benefit of staff and boards alike, and the joint and regional councils for gas staffs will function with the dignity and integrity that have characterised the workings of the joint industrial councils.

The Workers' Unions

The idea of two opposing factions in industry—the workers and the bosses—is dying rapidly, partly by volition and partly by propaganda, and both sides appreciate that they benefit from the co-operation of the other, and that certain details of industrial methods are best planned jointly. From their greater numbers the workers need to elect representatives to meet managers in consultation for any effective co-operation and more often than not the selection of these representatives is the key to the success of any joint effort. A good representative who can judge the average opinion of a number

of widely different types and the general needs of men in varying classes of work, who can reason and see reason, speak and also listen, is an asset to a works or welfare committee. Similarly, the men selected by staffs to represent them can ensure or prejudice the success of their particular branch of a staff association and therefore carry a great responsibility.

The great unions of the country have done magnificent work in the past, and provided they can retain the necessary control of their members and not forsake their true aims for politics, they will continue to foster the democracy in industry which we claim for our country. The Trades Union Congress, however, calls for representation of the workers—*i.e.*, representation of the unions—on the boards of the nationalised industries. A glance at the constitution of the area gas boards will show that the unions have not been overlooked in the search for men qualified for appointments on the boards and men appointed from the unions, with long experience of organisation and intimate knowledge of the workers needs and aims, should prove invaluable.

This is not representation as desired by the T.U.C., however, who want acting officials of the unions on the boards and a share in management at all levels. It is difficult to see how the latter aim can be realised unless management is to be by committees. Someone suitably qualified must make and assume responsibility for decisions; these functions cannot be delegated to heterogeneous committees if the industry is to be progressive and technically sound.

The interests of the workers, the staff included, should be considered in all policy decisions made by the boards, but no industry is run for the benefit of its workers only, and the workers' share in national ownership is no greater than that of any other section of the populace.

Small Works Problems

Having had time to survey the concerns now under their direction, divisional staffs are finding problems which in their solution will justify nationalisation, politics apart.

The engineer trained in a large modern works can hardly appreciate the difficulties met and not always overcome in some of the small works, many of which are operating 20-40 years after they should have been scrapped and rebuilt. There are works where condenser and washer are by-passed as unusable, no scrubber is available, and gas passes direct from retort house to purifiers; where not a single valve will operate; where a gasholder 25 years old has had to be scrapped as beyond repair on account of internal corrosion; where producer fires are regularly extinguished by flood water; where new meters fixed in 1947 are now corroded beyond redemption; where a steam boiler is kept permanently beside a long distribution main to clear repeated blockages; where consumers regularly cook the Sunday joint on Saturday afternoon and warm it up for Sunday; where a steel gasholder tank above ground is festooned with ropes supporting bags of cement inside the tank over the worst of the leaks; where ½ in. dia. services are pushed, not tapped, into 2 in. dia. mains; where a local farmer's steam tractor had to be used to provide steam for an exhauster engine; where over 30% of the gas made is unaccounted for. One can almost believe the town clerk who said that each time he tried to light the gas for his early morning cup of tea the gas blew out the match!

The reasons for these conditions are not difficult to find, the foremost being the reluctance of owners to establish renewal funds or to spend a penny more than necessary to keep the holders from grounding or the managers from leaving.

Yet other small undertakings have works and distribution systems which are almost text book models, well maintained and efficient within their limitation of size, and provide gas service which it will be difficult to improve, except perhaps in price.

With pooled resources of technical skill and equipment, many obvious defects can be remedied immediately, but where works are little better than derelict and remote from a source of bulk supply, very careful balances are necessary between the cost of reconstruction and continued operation and the cost of providing a bulk supply. Factors other than cost, such as the availability of labour, local amenities, and the disposal of by-products and effluents have to be considered, but the major problem is the financing of either scheme.

Sound reorganisation and reconstruction with an attractive tariff lead to increased sales and profits eventually, but there will be an interim period in which the capital outlay yields inadequate returns and the costs must be reflected in area prices as a whole.

How far the principle of uniform prices as a corollary to common ownership is accepted is for the boards to decide, but it does not conform with the relative economics of urban and rural communities, nor with the retention of the identities of undertakings, and even when all undertakings are in similar states of repair and efficiency, the differences in coal delivery costs will prevent automatic uniformity.

The standard of service to the consumer can be uniform. It will be designed by the boards to be good. Its uniformity and standard will depend upon us and our colleagues.

A GAS COOKER SCRUTINY

AN interesting analysis of features in gas cooker design was put forward recently in a paper by Dr. L. H. Smith, National Gas Association, Melbourne, given to the Southern Section of the Australian Gas Institute.

Regarding the oven, the author had the following, among other, comments to make. The number of oven shelf supports, he said, should be adequate, and it may be noted that the better class cookers carry six or seven shelf supports. Manufacturers, he continued, should be encouraged to fit more shelf supports in the cheaper grades of cookers, as without them it is not possible for the housewife to cope with her onerous duties, or to take full advantage of the potentialities of the gas-heated oven.

The question of whether the shelf supports should be fixed or movable has often been debated, but the former have the appearance of greater stability. Movable shelf supports (*i.e.*, gates) may render it easier in theory to clean the interior of the cooker, but the gates themselves have also to be cleaned, and their shape makes this a burden. There are few women who look upon their gas cookers as a kind of meccano unit to be taken apart and rebuilt periodically. Even where help is available in the house, the time could be more profitably employed.

It is essential, went on the author, that the grids themselves should be strong enough to carry a load and that they should not tilt when they are pulled out ; and it is to be regretted that there are so many cookers in use in which this bad feature is to be found. It is recommended that manufacturers should test their cookers for 'grid performance' under practical conditions. They might also spare a thought for the young housewife they knew in earlier days.

There has been considerable discussion regarding the marking of thermostats—whether they should be marked in degrees Fahrenheit or arbitrary numbers. The latter method of marking in Dr. Smith's opinion belongs to a bygone age, when the hand that rocks the cradle was not expected to display any intelligent interest in the mechanics of cooking. The adoption of a uniform method of marking—*i.e.*, in deg. F.—would also, of course, simplify the teaching of cooking in schools and demonstration kitchens, &c.

The application of neat gas jets to domestic cookers appears to be more than just a vogue, and opens up a new era in this field. 'The burners which we have seen here are very attractive in design, possess a much higher efficiency than any of the bunsen burners available here, are more silent and much more flexible than the bunsen burners. It is clear that the objections to the bunsen burner, which were discussed above, would not arise in the case of neat gas burners. I am not aware whether any of the major undertakings in Australia have considered the desirability of importing a number of these cookers and placing them under field test, but it seems that this would be a sound method of obtaining information in advance. Sooner or later some progressive organisation in this country is going to start manufacturing such cookers, and it will be necessary to be able to assess the effect of such cookers on service costs, as well as on sales. A little forward planning, in anticipation of this trend, would pay the gas industry good dividends.'

EFFICIENT USE OF LABOUR*

By S. K. PATTERSON, A.M.I.Mech.E., Assoc.M.Inst.Gas E.,
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***EDITOR'S NOTE*:—The following is an abstract of a full account given by the author of the efforts made during the past 10 years in the Galashiels gasworks to use labour in gas production to the best advantage. Output per man-hour has been doubled as a result of better plant factor, increased application of mechanical handling, and higher efficiency in gas production, particularly as regards the use of steam and electricity.**

IN 1942 Galashiels gas undertaking became members of the Federation of Gas Employers and the men joined the Transport and General Workers' Union. From that date each side enjoyed the benefits which were to be expected—the workers, the knowledge of rates, rise in wages, conditions, holidays, &c.; the management, the benefit of information and guidance; both, the machinery for the settlement of any disputes, which fortunately, were not many or complicated.

As decisions were reached at the Joint Industrial Council they were implemented by the undertaking, so that now workers enjoy (i) the six shift week, (ii) points system for relief shift workers, (iii) sick pay scheme, (iv) overtime agreements with double time for Sunday work, (v) two weeks' annual holiday and six statutory holidays with pay each year, (vi) the shorter working week with compensatory payments to stokers, (vii) bonus payments if required to work the New Year holidays. In addition, the undertaking, of its own accord, operates a superannuation scheme for all employees.

The output of gas from Galashiels gasworks has doubled in the period 1939-49, and in consequence the quantities of raw materials required to achieve this and the residual products resulting. Tonnage of coal, coke, and tar handled has increased from 10,618 tons in 1939 to 23,023 tons in 1949. In 1938, gas produced per 'effective man hour'—*i.e.*, the actual hours worked—was 3,157 cu.ft., and in 1949 was 6,217 cu.ft. In 1939, materials handled per 'effective man hour' was 0.276 tons, and in 1949, 0.5870 tons. The actual all-in works labour cost in 1939 was 4.79d. per 1,000 cu.ft. produced at the average rate per hour of 15.138d., whereas in 1949 the comparable figure was 5.28d. per 1,000 cu.ft. produced with the average rate per hour of 32.847d.

Output per man hour has therefore increased by 96.8%, and it is inferred that the main reasons for this are (i) better plant load factor, (ii) increased application of mechanical handling contrivances, and (iii) efficiency of production.

Mechanical Handling

In a small gasworks, mechanical handling methods must be limited to simple contrivances of low capital cost preferably capable of more than one duty. Portable equipment is, therefore, most suitable.

Since the installation of vertical retorts at Galashiels coal has always been handled from railway wagons on an overhead incoming line (13 ft. from floor level) to a receiving hopper, and then by gravity bucket chain to the retort house bunkers. Prior to 1939, coal was delivered in the undertaking's private hopper-bottomed wagons specially designed for ease in handling and emptying. There was a standby hand winch for haulage, but this was rarely used. With the outbreak of war, and the requisition of wagons by the Ministry of Transport into a common pool, the situation altered entirely. Wagons were received which had no bottom doors, often not even side doors, and in many cases without any doors at all. Difficulties were also experienced in shunting until it became necessary to use the hand winch for haulage every day.

The problem was met in the first instance by the use of barrows and hand labour to bring the stock coal forward to the gravity bucket conveyor, but as the quantity required to be lifted each day from stock kept on increasing, so did the effort required to handle it. In 1941, a 30 ft. portable stacker was purchased. This gave an immediate saving in time and effort. Not only could the coal be taken from stock pile to G.B. conveyor direct, in an emergency quickly and easily, but the stacker could be elevated some 15 ft. to feed into the overhead receiving hopper. The method naturally had its limitations when the stock pile was outside the 30 ft. range of the stacker. In 1943 it was decided to purchase a 50 ft. flat portable belt conveyor. Again the benefit was immediate though it remained necessary to supply sufficient labour to shovel the coal on to the conveyor. In 1946, the 50 ft. conveyor was replaced by a ½ cu. yd. Hi-lift Chaseside shovel, which, with the 30 ft. stacker, has solved the problem of handling coal from stock. The following account indicates the difference in labour consumption based on the handling of 20 tons of coal from stock pile to receiving hopper when the distance to be covered is 30 yards.

	Men	Hours	Total
Barrows	6	8	48
30 ft. Stacker	6	5	30
30 ft. Stacker and 50 ft. conveyor	5	4	20
30 ft. Stacker and Chaseside ...	2	2	4

A very significant fact which mere figures do not wholly indicate is that the mechanical shovel can perform its known duty day after day, whereas men, no matter how willing and anxious, become tired of this kind of work, which cannot be termed easy or pleasant.

With the continued increase in the amount of coal carbonised and prevailing conditions of unsuitable wagon traffic likely to continue, it was decided, in 1946, to install a wagon tippler. Opportunity was taken at the same time to replace the hand winch with an electric haulage winch. This installation was put into operation in January, 1949, and already a 50/60% saving in man hours has resulted.

The quantity of coke to be handled for sale rose from 1,751 tons to 5,572 tons between 1939 to 1949, thus creating the main labour 'bottleneck,' in the solution of which many improvisations overcame the serious lack of proper coke handling, screening, and storage plant. Many of the methods employed to accomplish the task were elementary, but, simple though they were, each in its way contributed in no small measure to increased output per man hour. Work on the laying out of better railway sidings and the erection of coke handling and storage plant is scheduled to commence early in 1950.

Purifier Cleaning and Oxide Handling

The emptying and filling of the boxes was previously done by using barrows to transport the spent and fresh oxide. The use of the 30 ft. stacker for this operation has again effected a saving in effort and time. The labour required to empty and clean a box with spent oxide, in a hard, dry, fully fouled condition, using hand picks and barrows, was 260/300 man hours in 1939, whereas the work is now done with mechanical assistance in 190/210 man hours, an average saving in time of approximately 30%. Semi-spent oxide is now prepared for re-use by an electrically-driven portable disintegrator, purchased in 1943, and this machine has assisted in reducing our labour requirements. The installation labour requirements. The installation of the electrostatic detarrer in 1947 has effected further savings in labour.

Though the portable equipment was intended primarily to handle coal, coke, and oxide, its use has by no means been limited to these materials. It has been used for a wide variety of duties, either individually or in combinations. The mechanical shovel has been a versatile servant, acting in addition to its main function as a bulldozer, as a lifting crane and as a pusher or puller of all manner of heavy objects. Experience has proved that the introduction of each piece of plant as detailed has resulted in appreciable savings in time and effort and has in every case been welcomed by the men. The capital cost has been quickly recovered, while the maintenance bill has been almost negligible relative to the work done.

Continued on p. 250

* From a Presidential Address to the Scottish Junior Gas Association (Eastern District), Edinburgh, October 8, 1949.

GAS DISTRIBUTION—MODERN METHODS OF CONTROL*

By T. W. AIKEN, Chief District Engineer,
and
B. I. STONE, Assistant London Manager, the Bryan Donkin Company, Limited

Mr. T. W. Aiken.

***EDITOR'S NOTE:*—Integration schemes now being developed throughout the country call for modern methods of controlling gas distribution, and in this paper the authors, relating their experience in devising and adapting new methods, discuss some new and some old and trusted systems and their application. They show how manufacturers have served the interests of the industry by perfecting equipment for automatic control, both direct and remote, and how inadequacy of storage accommodation may be offset by the judicious use of control systems.**

Mr. B. I. Stone.

THE days have long since passed when the only governor necessary for distribution was the station governor set at about 3 in. W.G., and this was sufficient to satisfy all consumers. Boosting on the inlet to the station governor was the next step but this was only a palliative which allowed distribution to be considered seriously. The developments that have since taken place in distribution have called for a far greater use of governors and the conditions have become so varied and exacting that many developments have been necessary in governor design.

Distribution pressures may be anything from a few inches W.G. to many lb. per sq. in., and mains systems are often complicated by being linked with inter-works bulk supplies and considerable ingenuity is often necessary to incorporate the necessary safeguards.

Reynolds District Governor

The standard Reynolds district governor is familiar to most engineers as it is used to deal with such a wide range of pressures, but, as many developments are an adaptation of, or an addition to, the principles used in the Reynolds governor, a short description of its operation may assist in understanding some of the governors derived from it. To obtain a powerful and positive control of the governor valve, the latent power available in the high pressure gas is harnessed by incorporating an auxiliary system.

In Fig. 1 the high pressure inlet is on the left, and the low pressure outlet on the right. J and K are the auxiliary governors, J reducing the high pressure to 10 in. or more W.G. and K in turn reducing that pressure to the required service or outlet pressure. The pressure in the pipe between J and K operating the auxiliary bowl I controls the opening and closing of the main governor H. A needle-point valve G regulates the flow of gas between these secondary governors, keeping it always at the required volume. E and F are ordinary globe valves for shutting off the auxiliary governors if desired. I is the auxiliary bowl which conveys the additional power, made possible by the auxiliary governors, to the main governor; it contains a leather diaphragm, which is exposed to the pressure between the two auxiliary governors by means of a connecting pipe which enters below the diaphragm. L, S and P make up a telescoping connection by which the varying pressure in the auxiliary bowl I is communicated to the main governor.

By adjusting the weight M and those on top of the auxiliary governor K, the governor can be set for the desired outlet pressure. The weight M must be sufficient to cause the diaphragm plate in K to float.

When only a very small quantity of gas is passing, the large governor will be shut, and the gas required will pass through the auxiliary governors. The intermediate pressure of 10 or more inches between J and K will be acting on the auxiliary bowl and assisting to keep the main governor shut. As the demand for gas increases, the governor K will gradually open, and as the needle-point valve G checks the amount of gas that can pass from the governor J, this causes the pressure under the auxiliary bowl I to fall, and thus the weight M causes the main governor to open gradually to its maximum volume as the demand for gas increases, the auxiliary governors still supplying a portion. As the demand diminishes the secondary

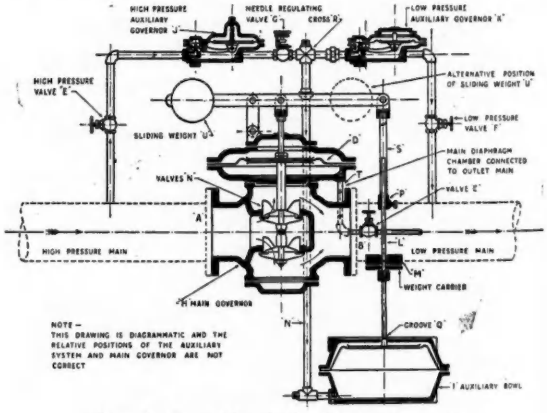

HIGH PRESSURE AUXILIARY GOVERNOR 'J'
NEEDLE REGULATING VALVE 'G'
LOW PRESSURE AUXILIARY GOVERNOR 'K'
ALTERNATIVE POSITION OF SLIDING WEIGHT 'M'
HIGH PRESSURE VALVE 'E'
LOW PRESSURE VALVE 'F'
SLIDING WEIGHT 'M'
MAIN DIAPHRAGM CHAMBER CONNECTED TO OUTLET MAIN
VALVES 'N'
VALVE 'E'
HIGH PRESSURE MAIN
LOW PRESSURE MAIN
WEIGHT CARRIER
'H' MAIN GOVERNOR
NOTE — THIS DRAWING IS DIAGRAMMATIC AND THE RELATIVE POSITIONS OF THE AUXILIARY SYSTEM AND MAIN GOVERNOR ARE NOT CORRECT
GROOVE 'Q'
'I' AUXILIARY BOWL

Fig. 1. Reynolds single district governor

governor K being weighted to the required outlet pressure, the slightest increase of district pressure will tend to close it. Therefore, when the demand decreases, governor K gradually closes, which causes the pressure to build up in the auxiliary bowl I. This produces the power, which, transmitted to the main governor H causes its valves to retard the flow of gas. Should the demand cease, this power will completely close the valves until more gas is again needed. On account of the large diaphragm area of the bowl I this action will be positive and very certain.

It is sometimes necessary to raise the pressure on the district to help at peak demands and a simple clock control can be arranged on a relay governor by adding a second pilot

* Paper presented to the Southern Association of Gas Engineers and Managers (Eastern District), October 18, 1949.

governor clock controlled, which, at pre-determined times, will give an increased outlet pressure.

Fig. 2 shows the application described. The governor 1 is loaded to the normal pressure required at off peak loads and governor 2 to that required at peak times. When governor 1 is in operation, governor 2, on account of its being more heavily weighted than governor 1, will fall wide open, allowing full gas way through it. The control diaphragm of governor I is under the influence of the outlet pressure via the small impulse pipe and in this impulse pipe is the clock controlled three-way cock. When the clock operates to raise the pressure, the cock is turned to shut off the pressure from the outlet main, and at the same time to vent the control diaphragm to atmosphere allowing the governor to fall wide open and the control of the system passes on to governor 2, which being more heavily loaded, gives an increased outlet pressure. Further clock controlled pilot governors can be added to give different outlet pressures at selected times or on selected days.

Donkin-Hanson Patent Auto Pilot Governor

A more comprehensive system of clock controlled loading has been developed giving control over the 168 hours of the week, and this allows a predetermined schedule to be used for each day of the week to deal with its peculiar peak demands such as Sunday mid-day load, Monday wash load, &c.

A spiral cam is used to load the pilot governor ; each turn of the spiral representing one day.

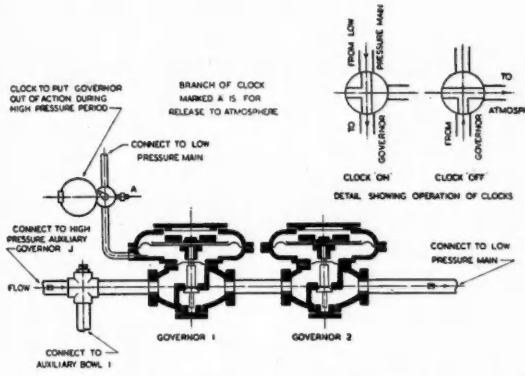

CLOCK TO PUT GOVERNOR OUT OF ACTION DURING HIGH PRESSURE PERIOD
BRANCH OF CLOCK MARKED A IS FOR RELEASE TO ATMOSPHERE
CONNECT TO LOW PRESSURE MAIN
FROM LOW PRESSURE MAIN
TO GOVERNOR
TO ATMOSPHERE
FROM GOVERNOR
CLOCK 'ON'
CLOCK 'OFF'
DETAIL SHOWING OPERATION OF CLOCKS
CONNECT TO HIGH PRESSURE AUXILIARY GOVERNOR J
CONNECT TO LOW PRESSURE MAIN
FLOW
GOVERNOR 1
GOVERNOR 2
CONNECT TO AUXILIARY BOWL 1

Fig. 2. Reynolds governor with clock controlled auxiliary governors

Eight cams each representing one day are used and these are clamped on a drum to form a helix ; the eighth cam is a replica of the first and included to give a margin of 24 hours for resetting.

The power for loading the pilot governor is not obtained from the clock but by altering the position of the fulcrum of the lever connecting the control diaphragm to the valve of the pilot governor. Any alteration of the fulcrum position causes the diaphragm to work in a correspondingly different mean position and a cone is arranged on this diaphragm which in lifting, picks up a series of weights from a platform. (Fig. 3.)

The arrangement of the control diaphragm with its cone loading weights and weight platform is indicated on this diagram. When the control diaphragm is working in its lowest position and giving its lowest controlled pressure, all the supplementary weights are carried on the platform A, but as the relative position of the diaphragm rises, it picks up weights successively and in doing so causes the governor to give an increased outlet pressure, owing to the added weight on the control diaphragm.

Either of the systems of clock control described can be applied to district or station governors.

Self Loading Governor

Another system of loading has been developed by which the outlet pressure of a governor automatically rises as the demand on the district increases. This feature is obtained by installing either a venturi or an orifice plate in the outlet main and using the differential to load the governor automatically.

It might be thought that by connecting the control diaphragm directly to the throat of the venturi, the desired effect could be obtained, this arrangement being common practice with service governors, but the solution is not quite so simple. The compressibility of gas renders such a simple system unstable except for very small pressure rises. The undesirable influence of this factor has been overcome by loading the pilot governor with spring tension and the tension on this spring is obtained by the differential across a diaphragm which is influenced by the venturi or orifice plate differential.

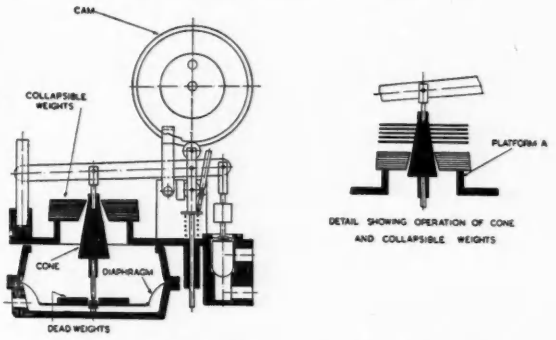


Fig. 3. Donkin Hanson auto pilot governor

Referring to Fig. 4, the governor K is the pilot governor which is initially loaded to the basic pressure and additional loading is derived from the spring C attached to the diaphragm B. The upper side of this diaphragm is connected to the outlet pressure and the lower side to the throat of the venturi. When the main governor is passing a small quantity of gas, the pressure at the throat of the venturi and at the outlet is approximately equal, but as the flow increases, the pressure at the throat falls in relation to the outlet pressure. This differential operating across the loading diaphragm causes it to move downwards and, by creating a tension in the spring C, loads the diaphragm of the pilot governor K and thereby increases the outlet pressure.

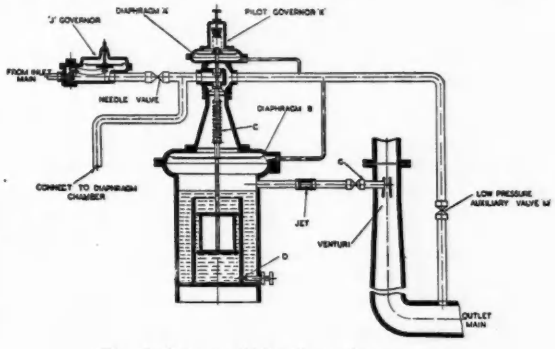


Fig. 4. Patent self loading pilot governor.

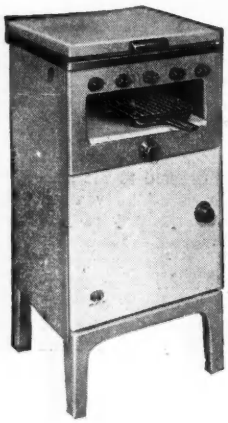
The float, which is in a chamber of oil, supports the weight of the moving parts of the loading system and being an approximate fit in the cylinder, also acts as a dashpot to assist in obtaining stability.

Patent Inspirator

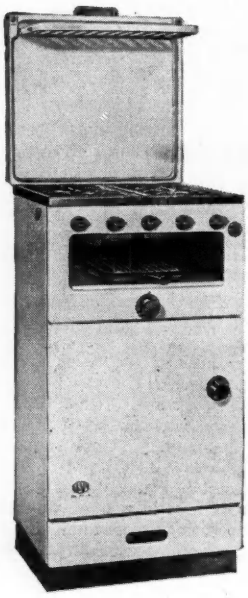
A development of considerable interest and of outstanding importance is the use of an inspirator in the auxiliary system to overcome what is considered to be, and often is, a limitation with relay governors.

With the types of loading described, using the normal auxiliary system with the needle valve, it is necessary for the auxiliary bowl or its equivalent to be loaded to some pressure

choice is one of the main features

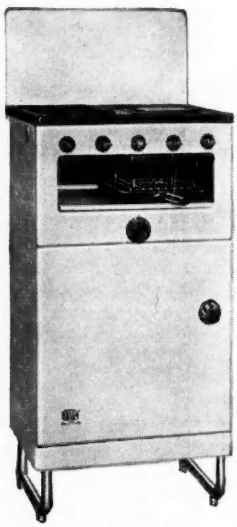


177 with hinged cover closed; 3 boiling burner hotplate; 14" oven; cast iron legs; dapple/white finish.



177 with hinged cover and shelf; 4 boiling burner hotplate; 16" oven; plinth base; cream/black finish.

177 with platerack and backplate; 4 boiling burner hotplate; 16" oven; cast iron legs; dapple/white finish.



177 with short splashplate; 3 boiling burner hotplate; 16" oven; tubular legs; cream finish.

MAIN 177

GAS COOKER

WITH A CHOICE OF INTERCHANGEABLE FEATURES

in excess of the maximum outlet pressure obtained and this imposes a limitation on the use of the governor inasmuch that minimum inlet pressure must at all times be in excess of the maximum outlet pressure. If the inlet pressure should fall to a figure below the bowl pressure, the main governor will fall open allowing the outlet pressure to rise to that of the inlet. It is often desirable to reduce pumping pressure at the works during off peak loads and a rise in the district pressure at such times is generally undesirable, also the outlet pressure will rise above the normal when the pumping plant is started up.

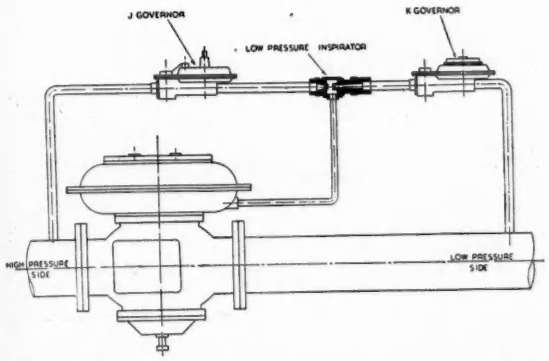


Fig. 5. Auxiliary system with patent low pressure inspirator

With this system, the diaphragm controlling the main governor is connected to the throat of the inspirator and this diaphragm is loaded to the minimum outlet pressure required.

If we imagine the outlet pressure to be falling, then the K governor (*i.e.*, the pilot governor) will start to open and thereby cause more gas to flow through it. This gas also has to flow through the inspirator and as the gas velocity increases, the pressure at the throat of the inspirator will tend to fall, lowering the pressure under the main diaphragm and causing the main governor to open and restore the outlet pressure.

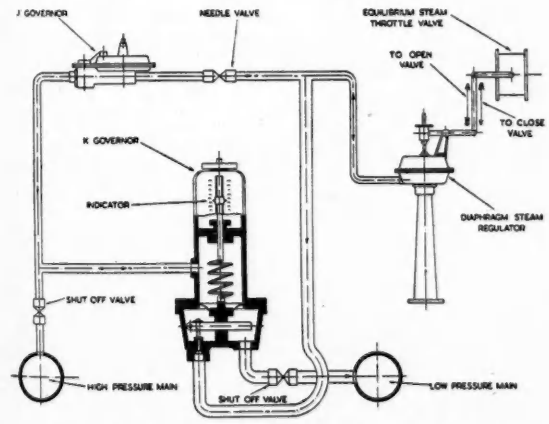


Fig. 6. Diaphragm steam regulator with auxiliary system

Assume the governor to be set to give 6 in. outlet pressure for normal periods and arranged with clock controlled loading to give 8 in. during peak loads, the holder pressure at night may be 5 in. and under these conditions the governor would fall wide open. When boosting or compressing starts and the pressure rises and reaches 6 in., this pressure will reach the main diaphragm and the governor will be operative; as the inlet pressure rises, 6 in. will still be maintained on the outlet. Later the clock control will load the K governor to 8 in., causing this governor to open; the gas flow through the auxiliary system will increase, causing a depression at the throat, accompanied by a rise in pressure at the outlet of the inspirator and a rise in outlet pressure.

It will be observed that under these conditions the pressure under the diaphragm of the main governor is 2 in. lower than the outlet pressure. By the addition of a second clock controlled pilot governor set to 4 in. W.G. outlet pressure to cover night time, and by loading the main governor to 4 in. W.G., the governor would be operative at all times.

Automatic Pressure Control

Governors acting on the same principles can be arranged to control the speed of prime movers driving boosting or compressing plant and Fig. 6 shows a relay governor controlling the speed of a steam driven compressor to maintain a constant adjustable pressure on the outlet. Change of pressure is obtained by adjustment of the screw.

Some very interesting problems have been met. For instance, near our own works is a factory taking gas from two different sources, each of a different calorific value. As a constant calorific value was wanted for some processes, a governor was designed to keep the proportions constant. In another case a governor was asked for to control the pressure of blast furnace gas to some steam boilers and in this instance the relay system of the governor was modified to be operated by the boiler pressure.

High Pressure Storage Governor

In a high pressure area a receiver was installed to give a storage to help meet each peak demand and a governor was

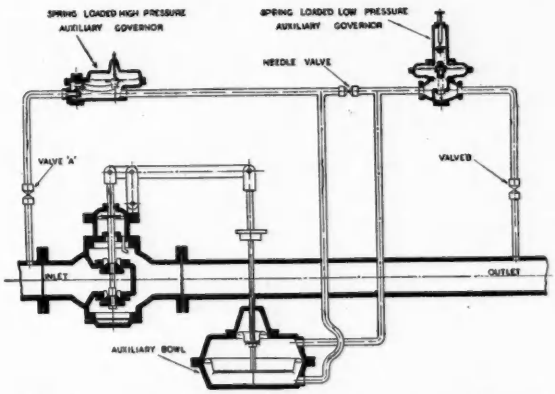


Fig. 7. Reynolds district governor with gas loaded bowl

asked for, and made, to allow gas to flow into the receiver at pressures from 1 to 50 lb. per sq. in., but to flow out only if the pressure fell to 5 lb. per sq. in.

In some cases it is considered advisable for the governor to be at rest in a closed position and to be opened by the demand for gas. In such a case the auxiliary governor bowl diaphragm is operated by a differential across it instead of having gas pressure on one side and atmospheric pressure on the other side. (Fig. 7.)

Gas Pressure Loaded Governors

This system is usually adopted when dealing with high pressure, as used in high pressure storage systems, the idea being that if the governor isolating valves are opened, the gas would not flow directly through the governor and on to the district before the governor can take control. A similar arrangement is used for governors to give a high outlet pressure, and although the pressure on each side of the diaphragm may be high, the differential across it will only be a few inches W.G., the advantage in such a case being that the diaphragm of the bowl can be comparatively thin and flexible, and by this means sensitive operation is obtained.

A few schemes are at present in operation whereby the gas is distributed from a central manufacturing station and supplies district holders. In some cases the feeder main also

supplies district governors feeding direct into low pressure mains, augmenting the pressure for peak loads. Schemes such as this are likely to become more common due to the closing down of the smaller gas manufacturing stations and the interconnections between the larger gas works. The problems involved in the economical operation of these systems have received some considerable thought and apparatus has been designed for fully automatic working.

A rather more complicated example of this system (Fig. 8) can be taken to illustrate the method of operation. Station (A) is the main station and control centre for the area. This station takes in gas at a fixed rate per hour per day, subject to seasonal fluctuations. The incoming grid gas is supplied at any pressure from 6 to 30 lb. per sq. in. The flow is controlled at a fixed rate by a high outlet pressure volumetric governor (F) which keeps the flow constant irrespective of fluctuations of inlet pressure. All the gas coming into this system is measured by a high pressure meter (G). Following the high pressure meter a relief valve (H) is fixed on inlet to holder. Gas is taken into the station at a fixed volume and measured at a constant pressure of, say, 5 lb. per sq. in. Relief valve (H) is set for 4 lb. per sq. in. The feeder main is taken from a point on inlet to relief valve (H) and this main is fed at a constant pressure of 4 lb. per sq. in.

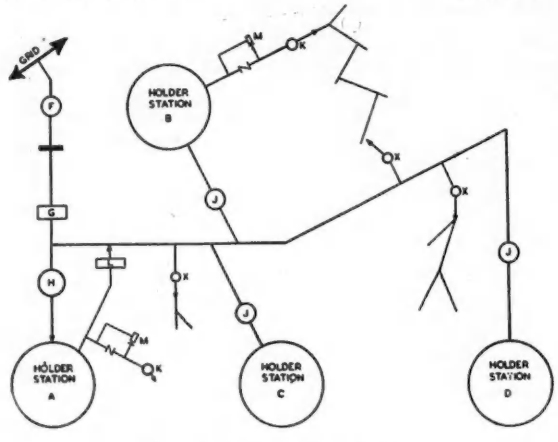


Fig. 8. Feeder main supplies

The feeder main supplies gas to the area holders (B), (C) and (D). Each of these stations is equipped with a low pressure volumetric governor (J) taking gas in at a fixed rate irrespective of variations of feeder main and holder pressures. This system is quite simple, foolproof and fully automatic. The area low pressure volumetric governors (J) shut off if the holder reaches, say, one plate from full and start up again at, say, four plates from full, or at any other predetermined holder position. Any individual low pressure volumetric governor (J) can be adjusted to pass a larger volume over a given time made necessary by the fact that the particular station has insufficient storage to meet a large peak with a constant input flow. The ideal is, of course, a steady and constant input, and generally the area loads can be met on this basis provided uncupped gas can be used to meet peak loads. A simple automatic device is used to start up a small fan booster when the holder is about to uncup and supplies the gas at an added pressure to the station governor inlet and stops when the holder is cupped again. It can also, of course, be started and stopped on a time basis.

Generally in these schemes, advantage is taken of the feeder main to reinforce outlying low pressure mains by district governors. This puts a peak on the system and the ability to meet this depends on the magnitude of the peak instant plus the fixed volumes going into area holders (B), (C) and (D) in relation to the volume passed by the high outlet pressure volumetric governor (F). In practically all cases on the basis of future requirements the peak is more than the input at (F). This can be met in two ways :—

1. By automatically shutting down the area holder low pressure volumetric governors (J) on a minimum inlet pressure or on a time basis.
2. By automatically bringing in an auxiliary compressor at the control end.

In the case of 1, the deficiency into the area holders can be made up during off peak times by increasing the input over a given time. In the case of extreme peaks, both 1 and 2 may be used.

(To be continued)

Efficient use of Labour (*Continued from p. 243*)

The major factor in the increased output per man hour for the period under review is undoubtedly due to the fact that the same gas making plant with the same number of stokers per shift has been used to double the make of gas. To accomplish this the stokers have been relieved of certain duties subsidiary to the actual routine of gas making and improvements have been effected to decrease the amount of labour required in the production of gas to meet increasing demands. These improvements were the result directly, or indirectly, of two important changes—(1) steam raising by waste heat recovery and (2) the introduction of a continuous supply of electricity.

The waste heat boiler was installed in 1942. Steam was raised to 120 lb./sq. in., reduced immediately to the permissible working pressures of the solid fuel boilers—*viz.*, 80 lb./sq. in. The bulk of the steam produced is fed to steam-driven high speed electrical generators, and the remainder used by certain pieces of ancillary plant. These electrical generating sets exhaust into a 30 lb./sq. in. low pressure line from which the rest of the steam consuming plant is supplied. Provision is made to supply processes with high or low pressure steam depending on prevailing conditions and all exhaust steam from ancillary plant is used for heating, preheating feed water, or condensed for re-use where practicable.

With the introduction in 1949 of a new boiler installation (two Lancashire boilers with breeze-burning grates) there is now no need to reduce the pressure to 80 lb. per sq. in., and work is proceeding on this scheme to attempt to make further use of low pressure and exhaust steam. Present indications are that a higher proportion of breeze to coke can be used in the new boilers than in the old boilers to maintain and increase output of steam per pound of fuel fired. The larger capacity of the new boiler will allow the stoker more freedom to carry out the rest of his duties. It might be noted here that the general design and layout of the new boiler installation, and the use of the ancillary equipment, soot blowers and electrical water treatment, are such that it should reduce the drudgery of boiler inspection and routine maintenance to a minimum in addition to reducing the pro rata labour consumption of firing when compared with the old plant.

To prevent the possibility of overload and to allow extended use of electricity at a reasonable cost a supply was brought in from the grid in 1946. This gave the added advantage of continuity of supply when the waste heat boiler and 10 kW steam set were off for annual inspection and maintenance. With the installation of the new solid fuel boiler plant in 1949, the steam engine on the 20 kW set was altered to operate with inlet pressures up to 120 lb./sq. in. against the fixed back pressure of 30 lb./sq. in. The switchgear arrangement is flexible enough to cater for any emergency and yet allow fine control of consumption of the grid supply while retaining its safety and 'useful' factor. Future electricity load to supply new plant to be erected within the next five years will be in excess of the existing generator capacity and will be undertaken by a new supply from the Electricity Board capable of meeting all future development.

It is impossible to state, in so many words, the actual saving in labour due to the increased use of electric power. The effect is reflected throughout the works in (1) steam production ; (2) plant maintenance ; (3) general cleanliness and tidiness.

A new grey edition (346/159), 'The Institution Gas Research Fellowship Report : 1947-48—A Study of Aerated Burner Flames : VII, Further Measurements of Ignition Velocity and Flame Stability,' by G. W. Culshaw, PH.D., F.R.I.C., and J. E. Garside, PH.D., is now available from the Institution of Gas Engineers, 1, Grosvenor Place, London, S.W.1, price 2s. 6d., post free.